

*University at Buffalo
Department of Chemistry*



Undergraduate Handbook

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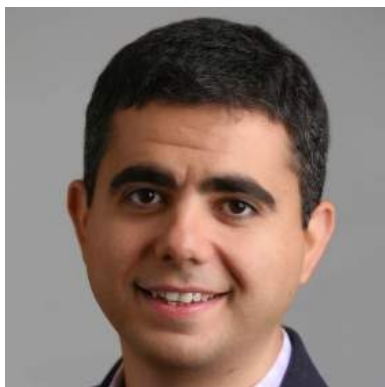
The Chairman's Welcome

This Undergraduate Handbook provides information to undergraduate students entering the Department of Chemistry as well as others who seek information about our department. The department consists of faculty, staff and students working together toward education in the chemical sciences and creating new knowledge through research. In this Handbook you will find information related to course descriptions, requirements for the Chemistry BA and BSc degrees and Medicinal Chemistry BSc degree, and a discussion of undergraduate research opportunities. I strongly encourage you to contact the Undergraduate Office (363 Natural Sciences Complex) or Professor Troy Wood, Director of Undergraduate Studies, for elaboration or answers to questions not answered herein. Additional information is also available at [Department of Chemistry - University at Buffalo](#)

We call your attention to an active colloquium series in the Department and a University-organized annual Open House designed to introduce potential newcomers to the University at Buffalo. The honors and awards conferred by the Department are also noted, as are career opportunities available to our graduates.

I hope you find the Handbook useful and informative. More importantly, I hope you will take any opportunity to get to know our faculty better during your stay at UB. The Student Affiliates of the American Chemical Society also provide an opportunity to meet faculty and other undergraduate Chemistry majors. This active and dedicated group of undergraduate students sponsors a number of departmental activities throughout the academic year.

I hope that you have a productive and gratifying undergraduate experience at UB. During your time in the Department of Chemistry, if you have problems or require further information, please do not hesitate to contact me.



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Career Paths in Chemistry and Medicinal Chemistry

After receiving the bachelor's degree, most chemistry majors either begin graduate study or immediately seek employment as chemists or medicinal chemists. At this university, about an equal number of chemistry graduates follow each of these career paths. Approximately half of the students going on to graduate school pursue medicine, law, education or management.

Many of our majors go on to graduate school in chemistry in order to pursue their doctoral degree.

According to a recent U.S. Labor Department Bureau of Labor Statistics report ([Chemists \(bls.gov\)](https://www.bls.gov)) 83,940 chemists were employed in 2022 with a 98.5% employment rate. The mean salary for chemists in 2022 was \$90,530.

The chemistry careers we often think of first are teaching in high schools, colleges and universities and conducting laboratory research in industry, government, and other research institutions. Doing research is often an important part of chemistry faculty positions in colleges and universities. Industries employing large numbers of chemists include chemical manufacturing, pharmaceuticals, construction materials, fertilizer, food, metallurgical materials, oil and paper. Significant numbers of chemists also work in industries that make consumer and industrial products. These include the automotive industry, companies manufacturing plastics, polymers and resins used in making paints and polishes and binders used in many products such as paper towels or diapers. Substantial numbers of chemists work in local, state and federal government research in forensics laboratories and agencies such as the Environmental Protection Agency, the National Aeronautics and Space Administration, the National Science Foundation, the Armed Forces and the State Department¹. The five largest industries for the employment of chemists in 2022 were Scientific Research and Development Services, Pharmaceutical and Medicine Manufacturing, Architectural Engineering and Related Services, Chemical Manufacturing, and the Federal Executive Branch.

¹ See "What Chemists Do", American Chemical Society:
<https://www.acs.org/careers/chemical-sciences.html>

Some Industries that Have Grown Rapidly to Become Major Employers of Chemists:

Chemical Synthesis: the efficient conversion of raw materials (such as minerals, petroleum, natural gases, coal and biomass) into more useful molecules and products.

Chemical Catalysis: processes by which a relatively small amount of foreign material augments the rate of a chemical reaction without being consumed in the reaction.

Bioprocesses, Biotechnology and Biocatalysis: processes using biological organisms in the development of useful products, including chemical products. Bioprocesses have been used since humans first made cheese, leavened bread, fermented wine, and brewed spirits. Biotechnology is being used to make pest-resistant plants and pharmaceuticals. Biocatalysis has been important since we first used enzymes.

Materials Technology: development of new synthetic materials and replacement of traditional materials such as metals, wood, glass and natural fibers with synthetic polymers and composite materials.

Computational Technologies: a broad range of applications from molecular modeling to process simulation and control.

“Green Chemistry”: a new approach to pollution prevention through the environmentally conscious design of chemical products and processes. By reducing or eliminating the use or generation of toxic substances associated with a particular synthesis or process, chemists can greatly reduce the risks to human health and the environment. ²

² See “What Chemists Do”, American Chemical Society:
<https://www.acs.org/careers/chemical-sciences.html>

Chemistry Programs at UB

Nearly all chemistry majors graduating in recent years from this university with an average of B or better, who elected graduate study, were accepted at one or more first-rate graduate schools in the United States.

Our department offers four unique undergraduate degree programs, two in Chemistry and two in Medicinal Chemistry. In addition, there are joint BA Chemistry/PharmD and BS Chemistry/MS Materials Design and Innovation programs.

BS in Chemistry

The BS in Chemistry is primarily oriented toward students who choose Chemistry as a professional goal. This program meets the criteria for a degree suggested by the American Chemical Society, and students completing the B.S. can obtain ACS certification. Chemists are commonly categorized by their specific areas of interest.

BA in Chemistry

The BA in Chemistry program is a flexible course of study appropriate for students who desire a wider choice of options to meet their educational goals. For example, by selective substitutions in the basic program, students may broaden their background to prepare for work or further study in such fields as medicine, the biochemical and biophysical sciences, geochemistry, physics or computer science. The BA program also provides sufficient free electives so that students may select numerous courses from among the arts and social sciences. By taking elective courses in history, economics, English and political science, BA chemistry students can also prepare themselves for law or business school.

BS in Medicinal Chemistry

The BS in Medicinal Chemistry is designed to provide the student with a basic chemical understanding of life processes and biological control and the laboratory skills necessary for research in medicinal chemistry. Depending on the choice of electives, the BS in Medicinal Chemistry can provide an optimum background for employment as a BS-level medicinal chemist in research institutes, industry and government; for entrance to graduate school in this or related areas; or for entrance to medical school.

BS/MS in Medicinal Chemistry

Another option for students is the five-year combined BS/MS program in Medicinal Chemistry. It is designed to produce graduates who are very well qualified as laboratory scientists for the pharmaceutical industry. Demand for lab technicians with strong experimental skills is high and this

program is designed to meet this demand. This program makes it possible to obtain an MS degree in Medicinal Chemistry in only five years. Students who are interested in this program should have done particularly well in chemistry, have an interest in synthetic organic chemistry and be able to work full time in the lab on their Master's Thesis project during the summer following the fourth year of study. This program is intensive and designed for above average students who have a clear idea of their career goals.

Chemistry BA/Chemistry Adolescent Education EdM

This combined program has components of study in the Department of Chemistry in the College of Arts and Sciences as well as the Department of Learning and Instruction in the Graduate School of Education. While in the Department of Chemistry, you benefit from a dedicated focus on the discipline of chemistry; in the Department of Learning and Instruction, you learn how to bring chemistry to life in grade 5 to 12 classrooms. The program allows a student to complete both a BA Chemistry and EdM in Chemistry Adolescence Education in only five years.

Chemistry BA/PharmD

In this combined program, you will study in the Department of Chemistry in the College of Arts and Sciences as well as the School of Pharmacy. There is a core chemistry curriculum for the BA Chemistry program as well as a core curriculum for the PharmD program. Students should submit an application through [Pharmacy College Application Service \(PharmCAS\)](#) by October 1 of their junior year. This program allows completion of the BA Chemistry and PharmD in six and a half years.

Chemistry BS/Materials Design and Innovation MS

As a chemistry student, you'll get a whole new perspective on everything around us as you study the composition of matter, then apply your knowledge in the field of engineering to design new materials to improve lives in the 21st century. The BS Chemistry curriculum provides a foundation to rapidly transition into graduate school with the MS Materials Design and Innovation program in the School of Engineering and Applied Sciences. BS Chemistry students should apply to the Graduate School after completing four semesters but not later than after completing six semesters. Both degrees can be completed in four and a half years.

Sample programs of study for each of the above are found in the pages of this handbook.

Double Majors

An attractive possibility for some students is a double major. A common choice for chemistry majors is to use biochemistry, biology, mathematics, geology, physics or computer science as a second major. With a judicious choice of electives, it is possible to complete requirements for both majors in four years. Students contemplating a double major should be aware that both degrees must be the same (for example BA/BA or BS/BS).

Double Degrees

Another possible degree option is the double degree. The double degree program enables students to earn two different degrees from among the B.A., B.F.A., B.P.S. and B.S. programs. Thirty hours, in addition to the baccalaureate requirement of 120 hours, must be spent earning the second degree, and requirements for each degree must be satisfied. Students should consult with the Director of Undergraduate Studies to plan their course of study.

Minor in Chemistry

Any student interested in obtaining a minor in Chemistry should apply directly through the Major/Minor Change [Request Form](#). For admission criteria, a student should have already completed CHE101 or CHE105 or CHE107 and MTH141 with a 2.0 average in these courses. The requirements for a minor degree are:

- CHE101-102/113-114 or CHE105-106 or CHE107-108/127-128
- CHE203-204/205-206 or CHE251-252
- MTH141-142 or MTH121-122
- 10 additional credit hours of chemistry courses at the 300/400-level (excluding CHE 498 or CHE 290).

Minor in Medicinal Chemistry

Medicinal Chemistry could represent an exciting and relevant addition to your current major at UB. It would be particularly appropriate for those majoring in Chemistry, Biochemistry, Biology and for those students who are in the pre-med or pre-dental programs. For admission criteria, a student should have already completed CHE101 or CHE105 or CHE107. The requirements for a minor in Medicinal Chemistry are:

- CHE101-102/113-114 or CHE105-106 or CHE107-108/127-128
- CHE203-204/205-206 or CHE251-252

- CHE301 Intermediate Organic Chemistry
- CHE 349 Physical Chemistry for the Life Sciences or CHE 319 Physical Chemistry I
- CH403 Principles of Biochemistry or CHE312 Chemistry of Biological Systems
- MCH401 Principles of Medicinal Chemistry I
- MCH402 Principles of Medicinal Chemistry II

Admission to the Program

Prospective majors should apply for admission to our programs with their application to the university. Learn more about applying for admission at [Chemistry Undergraduate Admissions](#).

Since many advanced courses have prerequisites and are offered only once a year, it is important to plan the full schedule as early in the program as possible. Sequentially required courses should be taken prior to beginning the senior year. Students are urged to consult with their advisor about course selection prior to each registration period.

Changing Your Major to Chemistry or Medicinal Chemistry

If you wish to change your major and join our program you should:

- Fill out through the Major/Minor Change [Request Form](#).
- See the Chemistry Department Director of Undergraduate Studies to evaluate your existing course record to see what substitutions can be used and plan your future course of study.
- Inform your academic advisor.

Advisement

At least once each semester, before registering for the following semester, majors are encouraged to correspond or make an appointment with the Director of Undergraduate Studies to plan their program of study or check that their progress is satisfactory. Students are encouraged to see the Undergraduate Director with their concerns, especially if they feel they may be facing academic difficulties.

UB HUB

The HUB on-line system provides records, registration, and financial information and services. These are available by accessing the HUB Student Center by clicking in the HUB Student Center tab from MyUB ([HUB Student Center](#)). In the Student Center you can manage academics, finances, and personal information.

Repeat Policy

According to University at Buffalo Regulations, a student can repeat a given course **only once for grade replacement purposes**. When a course is repeated the credits earned count only once for purposes of satisfying degree requirements and for purposes of calculating the student's GPA. When a course is repeated, the grade that is counted in calculating the GPA is the grade earned the second time, EVEN IF THAT GRADE IS LOWER than the grade earned the first time. All courses taken and all grades earned will appear on the student's transcript. The complete repeat policy may be viewed online: [Repeat Policy - University at Buffalo Undergraduate Degree & Course Catalog](#)

Controlled Enrollment Courses (Impacted Courses)

The intention of the Course Enrollment Control Policy is to allow students who are registering for an impacted course for the first time to have privileged access to that course. 'Impacted courses' are those which have limited seating due to student demand; they are identified as such in the [UB Undergraduate Catalog](#) and on the syllabus of the course. Because access to these courses will be preferentially given to students taking the course for the first time, there will be little access to these courses in the Fall and Spring semesters for students who wish to repeat the course; thus students who plan to re-enroll in a Controlled Enrollment course will be expected to repeat the course during the Summer Sessions. Chemistry courses currently listed as controlled enrollment courses include CHE101/113, CHE102/114, CHE107, CHE108, CHE203 and CHE204.

Petitioning Procedure

If a student is having difficulty meeting a particular requirement, the Undergraduate Affairs Committee may be petitioned to waive or replace a requirement with another course of work experience. Students must email a petition to the Undergraduate Office (NSC363) or the Director of Undergraduate Studies stating why they feel that the requirement should be waived, together with any supporting documents. A response usually takes 2-3 weeks, although simpler cases can be decided in 1-2 days. Statistically, about half of the petitions are approved.

Drop & Add Policy

New courses may be added by registered students during the add/drop period which lasts approximately one week in the fall and spring semesters by using the HUB Student Center. The [Student Calendar](#) provided by the Registrar's Office keeps a running list of important dates, such as the drop/add date.

The last period to drop courses without **financial** liability is the first week of class. Students may resign courses without **academic** penalty until the end of the eleventh week of classes, however financial penalties may be incurred. For further details and deadline dates visit the [Registrar's website](#).

Students wanting to withdraw from the university after the resignation period must consult with their academic advisors for appropriate procedures, justification and documentation to request an academic withdrawal (grade of “W”) Academic withdrawals are approved only in circumstances where impact to academic performance due to a personal or immediate-family medical event, disability, death or active military service is documented sufficiently. Further information can be found online here: [Drop/Add/Resign a Course | UB Office of the Registrar \(buffalo.edu\)](#)

Auditing of Courses

Students may audit a class only with permission of the instructor by submitting the Audit Form to the Office of the Registrar by the end of the 7th day of classes. All students will be charged for audited courses. Further information and the form may be found online at [Audit Form for Undergraduate Students \(buffalo.edu\)](#).

Registration in Graduate Courses

All undergraduate students who wish to take a graduate course in chemistry for **undergraduate credit** must submit the form found online here: <http://registrar.buffalo.edu/pdfs/OutsideofCareerPetition.pdf> Additional details can be found on the form. Submission deadline is the end of the drop/add period for the respective semester or summer session.

Prerequisites are:

- Junior or senior standing and acceptance into an academic major or an approved special major with an overall minimum GPA of 3.0, including transfer credit and completion of prerequisites required for the graduate course;
- Written request from the student to clearly state the academic necessity and rationale for taking the course to the Director of Undergraduate Studies.

Resignation from Courses

Students who choose to withdraw from one or more courses without financial penalty must do so before the end of the first week of classes each fall or spring semester by dropping the courses via HUB. Students may resign from courses until the end of the eleventh weeks of classes. Students who resign a course after the “drop/add” date will have an “R” grade on their transcript. Any student who is registered in a course after the end of the eleventh week may not officially resign. Courses dropped between the 7th day of classes and the eleventh week may incur financial penalties. For further details and deadline dates visit [Drop/Add/Resign a Course | UB Office of the Registrar \(buffalo.edu\)](#)

Students who are seeking administrative withdrawals after the deadline for resignation must now withdraw from all courses for a semester based on extraordinary circumstances. If approved, a student will receive a “W” grade for the courses and this grade will not count as having been attempted for purposes of establishing academic good standing. The deadline for submission of these petitions is the end of the subsequent semester.

Students who must withdraw after the last date to resign without academic penalty should consult with their academic advisors for the appropriate procedures.

NOTE: Non-attendance of a course or courses does not free a student from academic or financial penalty.

Leave of Absence

Students who are in good academic standing may take a leave of absence from the University. Leaves are granted for a maximum of two semesters, but may be extended. No more than four semesters of leave of absence are allowed during an undergraduate career. Students requesting a leave are instructed to seek advisement prior to the leave period for information on further action needed in regards to financial aid, scholarships and re-entry to UB.

The leave of absence form is online here:
<https://registrar.buffalo.edu/leaving-ub/leave-of-absence.php>

Chemistry Course Listings and Syllabi

Complete up to date listings and descriptions of the Chemistry and Medicinal Chemistry Courses are now online in the [University at Buffalo Undergraduate Catalog](#)

Copies of archived syllabi for course articulation may be obtained by emailing the Main Chemistry Office at raff@buffalo.edu.

Transfer Students—Introduction

Transfer students are particularly welcome in the Department of Chemistry. Due to the diverse backgrounds of these students, special individualized advisement by the Chemistry faculty helps ensure an efficient course of study leading to a baccalaureate degree. *Students should contact the undergraduate office by calling 645-6626 or e-mail the Director of Undergraduate Studies to schedule a meeting with the director for initial advisement.*

Information for Transfer Students

All of our degree programs in the Department of Chemistry expose the student to a selection of courses which prepare for entrance into graduate level programs or employment in the chemical industry. None of the degree programs are specifically recommended by the department since the educational objectives of students are so often different. For example, some students choose the flexible BA in Chemistry degree. Other students who expect to continue their education in a field such as medicine or dentistry often follow the BA program with a double major in another area, for example Biology, and those who expect to continue with chemistry as a major component of their career usually elect the BS program. The BA program is often recommended to transfer students because of the flexibility it offers in meshing courses taken at two different institutions. The Department works with each student to discover the program pathway that fits best with the student's career goals.

Transfer students from accredited institutions generally have little difficulty in making the transition to the University at Buffalo even though their freshman and sophomore degree requirements may not have been completed. It is recommended that applicants complete General Chemistry and College Calculus I and II in the freshman year. Organic Chemistry, Analytical Chemistry, Calculus III and the calculus-based Physics sequence should be completed by the sophomore year. If there is any doubt about the courses needed to meet our departmental requirements, courses which are specifically designated as being for science or engineering majors are the natural choice. Chemistry, Physics and Calculus courses which are designed to satisfy the needs of Social Science or Pre-med Majors should be avoided. Advanced Placement credit in Chemistry will transfer only as elective credit with a score of 3; scores of 4 or 5 will exempt students from taking CHE 101-102 and CHE 113-114. Advanced Placement credit in Calculus will transfer.

The Department of Chemistry does not evaluate credit hours from the transfer institution—this is the responsibility of the Office of Admissions. However, the Director of Undergraduate Studies is able to make value judgments concerning whether or not a departmental degree requirement has been completed. The judgment is made primarily on the basis of exposure to the subject matter and not merely on the basis of the number of credit hours earned or the title of the course. Rather, prerequisites and the number of lectures and laboratory sessions per week are used as a general guide. In almost every case the Director finds that the students have correctly evaluated the course in question. If there is a disagreement, a petitioning procedure is available to the student. Difficulties are very seldom serious enough to delay graduation beyond the fourth year of academic study. Since some of the junior and senior level chemistry courses are restricted to Chemistry majors it is important that transfer students make it known on their application that a major in Chemistry is their educational objective. This will be helpful in avoiding a forced registration procedure in these particular courses.

Tutoring Help for Undergraduate Students

The University at Buffalo and the Department of Chemistry offer an array of support services for students seeking assistance with their academic courses. In Chemistry courses, students are encouraged to first seek out help from their own professors and Teaching Assistants. Attending “Office Hours” can be a great way to get help! Faculty and Teaching Assistants post their available office hours on the UBLearns course pages for each class.

General Chemistry Help Center (located in NSC 110): This is a dedicated space for any students taking a General Chemistry course. The room can be a valuable resource for immediate assistance. Hours are posted on the room door every semester and each course’s UBLearns page

TASS Learning Center: This service center offers a range of tutoring services across various subjects, including Chemistry. You can learn more and schedule sessions through their student success gateway website: [Our Services - Student Success and Academic Support Gateway - University at Buffalo](#)

UB Grad Chem Club: You can email ubgradchemclub@gmail.com for potentially paid tutoring options. This email is monitored by our graduate students in Chemistry who might be willing to provide private tutoring sessions. Note: Graduate student tutors set their own fees and times for tutoring and are not certified or approved by the Department of Chemistry. Graduate students who are Teaching Assistants cannot tutor students taking a course which they are teaching.

The Math Place also provide help by appointment for students that need tutoring. Call 645-2394 for an appointment. They are both located on the second floor of Baldy Hall.

Lost and Found: Personal articles are frequently found by the cleaning staff in the building. These items are generally taken to the Department of Chemistry Office 359 Natural Sciences Complex, and may be claimed there.

Required Courses for Majors

Chemistry BA Program

Required Chemistry Core: (29-31 Credits)

1. One general chemistry sequence chosen from the following:

Sequence 1 (recommended):

- CHE 105LLR - Chemistry: Principles and Applications Credits: 5
- CHE 106LLR - Chemistry: Principles and Applications Credits: 5

Sequence 2:

- CHE 101LR - General Chemistry Credits: 4
- CHE 113LAB - General Chemistry Credits: 1
- CHE 102LR - General Chemistry Credits: 4
- CHE 114LAB - General Chemistry Credits: 1

Sequence 3:

- CHE 107LR - General Chemistry for Engineers I Credits: 3.5
- CHE 127LAB - General Chemistry for Engineers Laboratory 1 Credits: 0.5
- CHE 108LR - General Chemistry for Engineers II Credits: 3.5
- CHE 128LAB - General Chemistry for Engineers Laboratory 2 Credits: 0.5

2. One Organic chemistry sequence chosen from the following:

Sequence 1:

- CHE 203LR - Organic Chemistry Credits: 4
- CHE 205LAB - Organic Chemistry 1 LAB Credits: 1
- CHE 204LR - Organic Chemistry Credits: 4
- CHE 206LAB - Organic Chemistry 2 LAB Credits: 1

Sequence 2:

- CHE 251LLR - Contemporary Organic Chemistry Credits: 5
- CHE 252LLR - Contemporary Organic Chemistry Credits: 5

3. The following chemistry courses:

- CHE 314LEC - Introduction to Analytical Chemistry Credits: 3
- CHE 315LAB - Introduction to Analytical Chemistry Laboratory Credits: 2
- CHE 321LEC - Inorganic Chemistry I Credits: 3
- CHE 349LEC - Physical Chemistry for Life Sciences Credits: 3 *

In addition to the required core courses, there is a flexible Intermediate Chemistry Laboratory requirement:

4. Intermediate Chemistry Laboratory (4 credits minimum):

- CHE 301LLR - Intermediate Organic Chemistry Credits: 3
- CHE 322LLB - Inorganic Chemistry II Credits: 3
- CHE 329LAB - Physical Chemistry Laboratory I Credits: 2
- CHE 330LAB - Physical Chemistry Laboratory II Credits: 2

- CHE 350LAB - Physical Chemistry for Life Sciences Laboratory Credits: 1

There is also a technical elective requirement which is flexible in the technical courses that can be taken:

5. Technical Electives (9 credits minimum):
 - Three courses at the 300/400 level
 - See AAR for list of course options.

Required Courses Outside of Chemistry (17-18 Credits)*

6. General Physics
Select one of the following Physics sequences:

Sequence 1

- PHY 101LR - College Physics Credits: 4
- PHY 151LAB - College Physics I Lab Credits: 1
- PHY 102LR - College Physics II Credits: 4
- PHY 152LAB - College Physics II Lab Credits: 1

Sequence 2:

- PHY 107LR - General Physics I Credits: 4
- PHY 108LR - General Physics II Credits: 4
- PHY 158LAB - General Physics II Lab Credits: 1

7. Calculus

Select one of the following Calculus sequences:

Sequence 1:

- MTH 121LR - Survey of Calculus and Its Applications I Credits: 4
- MTH 122LR - Survey of Calculus and Its Applications II Credits: 4

Sequence 2

- MTH 141LR - College Calculus I Credits: 4
- MTH 142LR - College Calculus 2 Credits: 4

General Education Requirements

See the "[University at Buffalo Undergraduate Catalog](#)" for remaining university requirements.

***Students who wish to switch from the BA program to the BS program MUST complete MTH141-142-241 and PHY107-108-158**

Total Required Hours in Chemistry Core:	29-31
Intermediate Lab Requirement	4
Technical Electives	9
Total Required Hours Outside Chemistry	17-18
Total Credits Required for Major:	59-62

Course requirements may change. See your advisor for the most up-to-date information on your course of study.

Chemistry BS Program

Required Chemistry Courses (51-57 Credits)

1. Select one of the following General Chemistry sequences:

Sequence 1 (recommended):

- CHE 105LLR - Chemistry: Principles and Applications Credits: 5
- CHE 106LLR - Chemistry: Principles and Applications Credits: 5

Sequence 2:

- CHE 101LR - General Chemistry Credits: 4
- CHE 113LAB - General Chemistry Credits: 1
- CHE 102LR - General Chemistry Credits: 4
- CHE 114LAB - General Chemistry Credits: 1

Sequence 3:

- CHE 107LR - General Chemistry for Engineers I Credits: 3.5
- CHE 127LAB - General Chemistry for Engineers Laboratory 1 Credits: 0.5
- CHE 108LR - General Chemistry for Engineers II Credits: 3.5
- CHE 128LAB - General Chemistry for Engineers Laboratory 2 Credits: 0.5

2. One Organic sequence chosen from the following:

Sequence 1:

- CHE 203LR - Organic Chemistry Credits: 4
- CHE 205LAB - Organic Chemistry 1 LAB Credits: 1
- CHE 204LR - Organic Chemistry Credits: 4
- CHE 206LAB - Organic Chemistry 2 LAB Credits: 1

Sequence 2:

- CHE 251LLR - Contemporary Organic Chemistry Credits: 5
- CHE 252LLR - Contemporary Organic Chemistry Credits: 5

The following Chemistry courses:

- CHE 312LEC - Chemistry of Biological Systems Credits: 3
- CHE 314LEC - Introduction to Analytical Chemistry Credits: 3
- CHE 315LAB - Introduction to Analytical Chemistry Laboratory Credits: 2
- CHE 319LEC - Physical Chemistry Credits: 3
- CHE 320LEC - Physical Chemistry Credits: 3
- CHE 321LEC - Inorganic Chemistry I Credits: 3
- CHE 322LLB - Inorganic Chemistry II Credits: 3
- CHE 329LAB - Physical Chemistry Laboratory I Credits: 2
- CHE 376LLB - Introduction to Chemical Literature Credits: 3
- CHE 413LEC - Instrumental Analysis Credits: 3
- CHE 414LAB - Instrumental Analysis Laboratory Credits: 1

3. One technical elective Credits: 1-5

4. One additional 400 level, 3 credit hour lecture Chemistry course (excluding CHE 498).

5. One 300-level Chemistry Laboratory (2-3 credits)

- CHE 301LLR - Intermediate Organic Chemistry Credits: 3
- CHE 330LAB - Physical Chemistry Laboratory II Credits: 2

Required Courses Outside Chemistry (25 Credits)

6. General Physics
 - PHY 107LR - General Physics I Credits: 4
 - PHY 108LR - General Physics II Credits: 4
 - PHY 158LAB - General Physics II Lab Credits: 1
7. Calculus
 - MTH 141LR - College Calculus I Credits: 4
 - MTH 142LR - College Calculus 2 Credits: 4
 - MTH 241LR - College Calculus 3 Credits: 4
7. One advanced Math course (i.e. MTH306 or MTH309).

General Education Requirements

See the "[University at Buffalo Undergraduate Catalog](#)" for remaining university requirements.

Total Required Hours in Chemistry	51-57
300-level Laboratory Requirement	2-3
Total Required Hours Outside Chemistry	21
Advanced Mathematics Requirement	4
Total Credits Required for Major:	78-85

Course requirements may change. See your advisor for the most up-to-date information on your program of study.

Medicinal Chemistry BS Program

Required Courses (Major)

Required Medicinal Chemistry Core (51-53 Credits)

1. Select one of the following General Chemistry sequences:

Sequence 1 (recommended):

- CHE 105LLR - Chemistry: Principles and Applications Credits: 5
- CHE 106LLR - Chemistry: Principles and Applications Credits: 5

Sequence 2:

- CHE 101LR - General Chemistry Credits: 4
- CHE 113LAB - General Chemistry Credits: 1
- CHE 102LR - General Chemistry Credits: 4
- CHE 114LAB - General Chemistry Credits: 1

2. One Organic sequence chosen from the following:

Sequence 1:

- CHE 203LR - Organic Chemistry Credits: 4
- CHE 205LAB - Organic Chemistry 1 LAB Credits: 1
- CHE 204LR - Organic Chemistry Credits: 4
- CHE 206LAB - Organic Chemistry 2 LAB Credits: 1

Sequence 2:

- CHE 251LLR - Contemporary Organic Chemistry Credits: 5
- CHE 252LLR - Contemporary Organic Chemistry Credits: 5

3. One Chemistry Laboratory Elective Course (2-3 credits):

- CHE 322LLB - Inorganic Chemistry II Credits: 3
- CHE 329LAB - Physical Chemistry Laboratory I Credits: 2
- CHE 330LAB - Physical Chemistry Laboratory II Credits: 2

4. The following Chemistry and Medicinal Chemistry Courses:

- CHE 301LLR - Intermediate Organic Chemistry Credits: 3
- CHE 312LEC - Chemistry of Biological Systems Credits: 3 (recommended)

OR

- BCH 403LEC - Biochemical Principles Credits: 4
- CHE 314LEC - Introduction to Analytical Chemistry Credits: 3
- CHE 315LAB - Introduction to Analytical Chemistry Laboratory Credits: 2
- CHE 319LEC - Physical Chemistry Credits: 3
- CHE 320LEC - Physical Chemistry Credits: 3
- CHE 321LEC - Inorganic Chemistry I Credits: 3
- CHE 455LEC - Advanced Organic Chemistry Credits: 3
- MCH 401LEC - Drug Discovery Principles Credits: 3

5. Fifteen (15) credit hours in science electives.

- See AAR for list of course options
- MCH 498 is recommended, not required.

Required Courses Outside the Major

(21 Credits)

6. Cell Biology

- BIO 201LEC - Cell Biology Credits: 3
- BIO 211LAB - Cell Biology Lab Credits: 1

7. General Physics

- PHY 107LR - General Physics I Credits: 4
- PHY 108LR - General Physics II Credits: 4
- PHY 158LAB - General Physics II Lab Credits: 1

8. Calculus

- MTH 141LR - College Calculus I Credits: 4
- MTH 142LR - College Calculus 2 Credits: 4

General Education Requirements

See the "[University at Buffalo Undergraduate Catalog](#)" for remaining university requirements.

Total Required Hours in Medicinal Chemistry Core	51-53
Total Required Hours Outside of Chemistry	21
Total Required Hours in Science Electives	15
Total Credits Required for Major:	87-89

Course requirements may change. See your advisor for the most up-to-date information on your program of study.

Medicinal Chemistry Combined BS/MS Program

Required Courses (Major)

Required Undergraduate Chemistry Courses (45-47 Credits)

1. Select one of the following General Chemistry sequences:

Sequence 1 (recommended):

- CHE 105LLR - Chemistry: Principles and Applications Credits: 5
- CHE 106LLR - Chemistry: Principles and Applications Credits: 5

Sequence 2:

- CHE 101LR - General Chemistry Credits: 4
- CHE 113LAB - General Chemistry Credits: 1
- CHE 102LR - General Chemistry Credits: 4
- CHE 114LAB - General Chemistry Credits: 1

2. One Organic sequence chosen from the following:

Sequence 1:

- CHE 203LR - Organic Chemistry Credits: 4
- CHE 205LAB - Organic Chemistry 1 LAB Credits: 1
- CHE 204LR - Organic Chemistry Credits: 4
- CHE 206LBR - Organic Chemistry 2 LAB Credits: 1

Sequence 2:

- CHE 251LLR - Contemporary Organic Chemistry Credits: 5
- CHE 252LLR - Contemporary Organic Chemistry Credits: 5

3. One Chemistry Laboratory Elective Course (2-3 credits):

- CHE 322LLB - Inorganic Chemistry II Credits: 3
- CHE 329LAB - Physical Chemistry Laboratory I Credits: 2
- CHE 330LAB - Physical Chemistry Laboratory II Credits: 2

4. The following Chemistry and Medicinal Chemistry Courses:

- CHE 301LLR - Intermediate Organic Chemistry Credits: 3
- CHE 312LEC – Chemistry of Biological Systems Credits: 3 (recommended)

OR

- BCH 403LEC - Biochemical Principles Credits: 4
- CHE 314LEC - Introduction to Analytical Chemistry Credits: 3
- CHE 315LAB - Introduction to Analytical Chemistry Laboratory Credits: 2
- CHE 319LEC - Physical Chemistry Credits: 3
- CHE 320LEC - Physical Chemistry Credits: 3
- CHE 321LEC - Inorganic Chemistry I Credits: 3
- CHE 455LEC - Advanced Organic Chemistry Credits: 3
- MTH 141LR - College Calculus I Credits: 4
- MTH 142LR - College Calculus 2 Credits: 4
- PHY 107LR - General Physics I Credits: 4
- PHY 108LR - General Physics II Credits: 4
- PHY 158LAB - General Physics II Lab Credits: 1

5. One undergraduate science elective (3 credit hours)

- See AAR for list of course options
- MCH 498 is recommended, not required.

Required Courses Outside the Major

(21 Credits)

6. Cell Biology
 - BIO 201LEC - Cell Biology Credits: 3
 - BIO 211LAB - Cell Biology Lab Credits: 1
7. General Physics
 - PHY 107LR - General Physics I Credits: 4
 - PHY 108LR - General Physics II Credits: 4
 - PHY 158LAB - General Physics II Lab Credits: 1
8. Calculus
 - MTH 141LR - College Calculus I Credits: 4
 - MTH 142LR - College Calculus 2 Credits: 4

Graduate Course Requirements

1. Medicinal Chemistry Core (18 credits)
 - CHE 501LEC Organic Chemistry Credits: 3
 - MCH 501LEC Drug Discovery Principles Credits: 3
 - MCH 615LAB Medicinal Chemistry Res AND MCH 616LAB Medicinal Chemistry Res (12 credit hours total)
 - MCH 700TUT Thesis Guidance
2. Four Elective Graduate Chemistry/Medicinal Chemistry Graduate Lecture Courses (12 credits)

One elective chosen from the following list:

- CHE 503 - (Inorganic Chemistry)
- CHE 505 - (Physical Chemistry I)
- CHE 506 - (Physical Chemistry II)
- CHE 507 - (Analytical Chemistry)
- CHE 508 - (Statistics & Instrumentation)

Two electives' courses chosen from following list:

- CHE 502 - (Synthetic Organic Chemistry) OR
- MCH 517 - (Heterocyclic Chemistry)
- MCH 502 - (Medicinal Chemistry 2)
- MCH 524 - (Mechanisms of Drug Action)
- MCH 525 - (Molecular Modeling)
- MCH 527 - (Combinatorial Chemistry)
- PHC 531 - (Intro to Pharmacokinetics and Biopharmaceutics 1) OR
- PHC 630 - (Drug Metabolism and Disposition)

3. One Graduate CHE/MCH Lecture Course

General Education Requirements

See the "[University at Buffalo Undergraduate Catalog](#)" for remaining university requirements. Course requirements may change. See your advisor for the most up-to-date information on your program of study.

Total Required UG Hours in Medicinal Chemistry Core	45-47
Total Required Hours Outside of Chemistry	21
Total Required UG Hours in Science Electives	3
Total Undergraduate Credits Required for Major:	69-71
Total Undergraduate Credits Required:	98-100
Total Graduate Credits Required for Degree:	30
Total Credits Required for Graduation:	128-130

Important Information About the Combined BS/MS in Medicinal Chemistry:

- Student may be admitted no sooner than the end of the sophomore year and no later than the end of the junior year. A minimum GPA of 3.0 and three supportive letters of recommendation from faculty are required for consideration.
- Because of the importance of effective communications, it is recommended that the non-science electives include courses chosen to strengthen speaking and writing skills.
- In addition to taking these courses, the student must write and orally defend a thesis and must demonstrate basic computer skills.
- As shown in the sample program, the research can be carried out during the academic year. However, students desiring to reduce the work load during the academic year could carry out a portion of the research during the summer between years 3 and 4.
- One of the courses should be taken for graduate credit, the other for undergraduate credit.
- To be certain of completing the research before the end of the fifth year, students are encouraged to spend a portion of the summer between the fourth and fifth years on research.

Application Procedure for the Combined BS/MS in Medicinal Chemistry:

To be admitted to this program, students would be expected to have completed two years of undergraduate education including the courses identified as the pre-requisite courses. Students not currently enrolled in UB would need to follow the University requirements for transferring to this University.

Chemistry BS/Materials Design and Innovation MS

Undergraduate Course Requirements

Introductory Calculus and Physics Courses (21 credits)

- MTH 141LR – College Calculus 1 Credits: 4
- MTH 142LR – College Calculus 2 Credits: 4
- MTH 241LR – College Calculus 3 Credits: 4
- PHY 107LR – General Physics I Credits: 4
- PHY 108 LR – General Physics II Credits: 4
- PHY 158LAB – General Physics II Lab Credits: 1

Chemistry Core (50 credits)

Select one of the following General Chemistry sequences:

Sequence 1:

- CHE 101LR – General Chemistry Credits: 4
- CHE 113LAB – General Chemistry Credits: 1
- CHE 102LR – General Chemistry Credits: 4
- CHE 114LAB – General Chemistry Credits: 1

Sequence 2:

- CHE 105LLR – Chemistry: Principles and Applications Credits: 5
- CHE 106LLR – Chemistry: Principles and Applications Credits: 5

Select one of the following Organic Chemistry sequences:

Sequence 1:

- CHE 203LR – Organic Chemistry Credits: 4
- CHE 205LAB – Organic Chemistry 1 LAB Credits: 1
- CHE 204LR – Organic Chemistry Credits: 4
- CHE 206LAB – Organic Chemistry 2 LAB Credits: 1

Sequence 2:

- CHE 251LLR – Contemporary Organic Chemistry Credits: 5
- CHE 252LLR – Contemporary Organic Chemistry Credits: 5

Additional Required Courses:

- CHE 312LEC – Chemistry of Biological Systems Credits: 3
- CHE 314LEC – Introduction to Analytical Chemistry Credits: 3
- CHE 315LAB – Introduction to Analytical Chemistry Laboratory Credits: 2
- CHE 319LEC – Physical Chemistry Credits: 3
- CHE 320LEC – Physical Chemistry Credits: 3
- CHE 321LEC – Inorganic Chemistry I Credits: 3
- CHE 322LLB – Inorganic Chemistry II Credits: 3
- CHE 329LAB – Physical Chemistry Laboratory I Credits: 2
- CHE 330LAB – Physical Chemistry Laboratory II Credits: 2
- CHE 376LLB – Introduction to Chemical Literature Credits: 3
- CHE 413LEC – Instrumental Analysis Credits: 3

One Advanced Mathematics Course (4 credits)

- MTH 309LR – Introductory Linear Algebra Credits: 4

Shared Program (14-15 credits)

- CHE 414LAB – Instrumental Analysis Laboratory Credit:1 and elective Credits: 2 **or** MDI 507LEC – Quantitative Methods for Materials Characterization Credits: 3
- CHE 400-level elective Credits: 3 **or** MDI 501LEC – Introduction to Materials Design and Informatics Credits: 3
- Technical elective Credits: 3 or MDI 502LEC – Quantitative Structure-Property Relationships in Materials Credits: 3
- Additional elective Credits: 5 or MDI 503LEC – Thermodynamics and Molecular Structure of Materials Credits: 3 & MDI 505LEC – Computational Materials Chemistry and Physics Credits: 3

Additional Degree Requirements Include:

- Additional coursework to fulfill UB Curriculum requirements.
- Elective courses as needed to complete the 120-credit hour total

Total Credits Required for Major: 89-90

Total Credits Required for Graduation: 120

Total Credit Hours Required represents the minimum credits needed to complete this program and may vary based on a number of circumstances. This chart should not be used for financial aid purposes.

Graduate Course Requirements**Materials Design and Innovation Core (15 credits)**

- MDI 504LEC – Multivariate Statistics and Materials Informatics Credits: 3
- MDI 506LEC – Kinetics, Microstructure and Defects Credits: 3
- MDI 508LEC – Experimental Design Credits: 3
- Remaining 6 credits can be any combination of electives, MDI 700TUT Project Guidance, or MDI 701TUT Thesis Guidance.

Total Graduate Credits Required for Degree: 30

Total Credits Required for Graduation:

150 if taken 1 at a time

14 Shared credits

136 Credits in Combined Program

Total Credit Hours Required represents the minimum credits needed to complete this program and may vary based on a number of circumstances. This should not be used for financial aid purposes.

Chemistry BA/Chemistry Adolescence Education EdM

Required Courses (Major)

- CHE 101LR - General Chemistry Credits: 4
- CHE 102LR - General Chemistry Credits: 4
- CHE 113LAB - General Chemistry Credits: 1
- CHE 114LAB - General Chemistry Credits: 1
- CHE 203LR - Organic Chemistry Credits: 4
- CHE 204LR - Organic Chemistry Credits: 4
- CHE 205LBR - Organic Chemistry 1 LAB Credits: 1
- CHE 206LBR - Organic Chemistry 2 LAB Credits: 1
- CHE 314LEC - Introduction to Analytical Chemistry Credits: 3
- CHE 315LAB - Introduction to Analytical Chemistry Laboratory Credits: 2
- CHE 321LEC - Inorganic Chemistry I Credits: 3
- CHE 349LEC - Physical Chemistry for Life Sciences Credits: 3

Intermediate Chemistry Laboratory (4 credits minimum)

- CHE 301LLR - Intermediate Organic Chemistry Credits: 3
- CHE 322LLB - Inorganic Chemistry II Credits: 3
- CHE 329LAB - Physical Chemistry Laboratory I Credits: 2
- CHE 330LAB - Physical Chemistry Laboratory II Credits: 2
- CHE 350LAB - Physical Chemistry for Life Sciences Laboratory Credits: 1 Lab Elective

Other Required Courses (26-27 credits)

Select one of the following Calculus sequences:

Sequence 1:

- MTH 121LR - Survey of Calculus and Its Applications I Credits: 4
- MTH 122LR - Survey of Calculus and Its Applications II Credits: 4

Sequence 2:

- MTH 141LR - College Calculus I Credits: 4
- MTH 142LR - College Calculus 2 Credits: 4

Select one of the following Physics sequences:

Sequence 1:

- PHY 101LR - College Physics Credits: 4
- PHY 151LAB - College Physics I Lab Credits: 1
- PHY 102LR - College Physics II Credits: 4
- PHY 152LAB - College Physics II Lab Credits: 1

Sequence 2:

- PHY 107LR - General Physics I Credits: 4
- PHY 108LR - General Physics II Credits: 4
- PHY 158LAB - General Physics II Lab Credits: 1

Technical Electives at the 300/400 level (9 credits minimum)

See AAR for list of course options

Undergraduate Education Core (16 credits)**

- CEP 400LEC - Educational Psychology Credits: 3 *
- ELP 405LEC - Sociology of Education Credits: 3 *
- LAI 350LEC - Introduction to Education Credits: 4
- LAI 414LEC - Adolescent Writing Across the Curriculum Credits: 3 *
- LAI 474SEM - Teaching the Exceptional Learner in the Regular Education Classroom Credits: 3 *

Graduate Course Requirements**

Chemistry Adolescence Education Core (27 credits)

- LAI 533 - Science Instruction Topics
- LAI 534 - Measurement and Evaluation in Science Instruction **OR** LAI 515 Action Research to Improve Teaching and Learning
- LAI 552 - Middle Childhood/Adolescent Literacy Methods
- LAI 595 - Supervised Teaching II
- LAI 619 - Methods for Teaching Science (Grades 5-12)
- LAI 667 - Field Experience
- LAI 668 - Supervised Teaching I
- LAI 674 - Seminar in Teaching
- LAI 698 - Instructional Strategies in Inclusive Classrooms

Four Chemistry Electives (12 credits)

Advisor approved 500 level science and/or science education electives offered through the College of Arts and Sciences or the Graduate School of Education and/or: LAI 531, LAI 532, LAI 535, LAI 637, LAI 639

Culminating Experience (1 credit)

- LAI 700 – Capstone

General Education Requirements

See the "[University at Buffalo Undergraduate Catalog](#)" for remaining university requirements. Course requirements may change. See your advisor for the most up-to-date information on your program of study.

Total Credits Required for Undergraduate Major: 61-62

Total Credits Required for Major: 106-107

Total Graduate Credits Required for Degree: 40

Total Credits Required for Graduation: 146-147

Chemistry BA/PharmD

Chemistry Core (30-34 credits)

Select one of the following General Chemistry sequences:

Sequence 1 (recommended):

- CHE 105LLR - Chemistry: Principles and Applications Credits: 5
- CHE 106LLR - Chemistry: Principles and Applications Credits: 5

Sequence 2:

- CHE 101LR - General Chemistry Credits: 4
- CHE 113LAB - General Chemistry Credits: 1
- CHE 102LR - General Chemistry Credits: 4
- CHE 114LAB - General Chemistry Credits: 1

Sequence 3:

- CHE 107LR - General Chemistry for Engineers I Credits: 3.5
- CHE 127LAB - General Chemistry for Engineers Laboratory 1 Credits: 0.5
- CHE 108LR - General Chemistry for Engineers II Credits: 3.5
- CHE 128LAB - General Chemistry for Engineers Laboratory 2 Credits: 0.5

Select one of the following Organic Chemistry sequences:

Sequence 1:

- CHE 203LR - Organic Chemistry Credits: 4
- CHE 205LAB - Organic Chemistry 1 LAB Credits: 1
- CHE 204LR - Organic Chemistry Credits: 4
- CHE 206LAB - Organic Chemistry 2 LAB Credits: 1

Sequence 2:

- CHE 251LLR - Contemporary Organic Chemistry Credits: 5
- CHE 252LLR - Contemporary Organic Chemistry Credits: 5

Additional Required Courses:

- CHE 314LEC - Introduction to Analytical Chemistry Credits: 3
- CHE 315LAB - Introduction to Analytical Chemistry Laboratory Credits: 2
- CHE 321LEC - Inorganic Chemistry I Credits: 3
- CHE 349LEC - Physical Chemistry for Life Sciences Credits: 3

One 300-level Chemistry Laboratory Course (1-3 credits)

- CHE 301LLR - Intermediate Organic Chemistry Credits: 3
- CHE 322LLB - Inorganic Chemistry II Credits: 3
- CHE 329LAB - Physical Chemistry Laboratory I Credits: 2
- CHE 330LAB - Physical Chemistry Laboratory II Credits: 2
- CHE 350LAB - Physical Chemistry for Life Sciences Laboratory Credits: 1

Other Required Courses (48-49 credits)

- BIO 200LLB - Evolutionary Biology Credits: 5
- BIO 201LEC - Cell Biology Credits: 3
- BIO 211LAB - Cell Biology Lab Credits: 1
- PAS 313LLB - Human Anatomy Credits: 4
- BCH 403LEC - Biochemical Principles Credits: 4
- PGY 451LEC - Human Physiology I Credits: 3
- PGY 452LEC - Human Physiology II Credits: 3

Select one of the following Calculus sequences:

Sequence 1:

- MTH 121LR - Survey of Calculus and Its Applications I Credits: 4
- MTH 122LR - Survey of Calculus and Its Applications II Credits: 4

Sequence 2:

- MTH 141LR - College Calculus I Credits: 4
- MTH 142LR - College Calculus 2 Credits: 4

Select one of the following Statistics Courses totaling 4 credits:

- STA 119LEC - Statistical Methods Credits: 3
- STA 119REC - Statistical Methods Credits: 1
- PSY 207LLB - Psychological Statistics Credits: 4
- SOC 294LR - Basic Statistics for Social Sciences Credits: 4

Select one of the following Microbiology courses:

- MIC 301LLB - Microbiology for Allied Health Professionals Credits: 4
- MIC 401LLB - Biomedical Microbiology Credits: 4

Select one of the following Physics sequences:

Sequence 1:

- PHY 101LR - College Physics Credits: 4
- PHY 151LAB - College Physics I Lab Credits: 1
- PHY 102LR - College Physics II Credits: 4
- PHY 152LAB - College Physics II Lab Credits: 1

Sequence 2:

- PHY 107LR - General Physics I Credits: 4
- PHY 108LR - General Physics II Credits: 4
- PHY 158LAB - General Physics II Lab Credits: 1

Graduate Course Requirements

Pharmacy Core (142.5 credits) See the "[University at Buffalo Undergraduate Catalog](#)" for a list of courses.

General Education Requirements

See the "[University at Buffalo Undergraduate Catalog](#)" for remaining university requirements.

Course requirements may change. See your advisor for the most up-to-date information on your program of study.

Total Credits Required for Undergraduate Major: 78-83

Total Undergraduate Credits Required: 101-106

Total Graduate Credits Required for Degree: 142.5

Total Credits Required for Graduation: 243.5-248.5

List of Technical Electives

CHE B.S. Degree: For the B.S. degree, one Chemistry, Science, Engineering or Math elective is required. Broadly speaking, the elective may be any 3 credit or more lecture course, sophomore (200) level or higher in a technical area other than chemistry. Required courses such as the math sequence cannot be used as technical electives.

CHE B.A. Degree: For the B.A. degree, three courses chosen from this list are required. They can be chemistry and non-chemistry. If there is a course that you think will fulfill this requirement and it is not listed here, please contact the Director of Undergraduate Studies for permission to use the course.

Listed below are some of the more popular choices for technical electives. Other courses such as upper level Chemistry courses can be used with the prior permission of the Director of Undergraduate Studies. See the Undergraduate Catalog for complete course descriptions and prerequisites.

The full elective list is in chemistry student's AAR under the technical elective requirement.

This is a partial list of courses that have been used in the past. If there is a course that you would like to use as a technical elective and it is not listed here, check your AAR for the full list or contact the chemistry department for approval BEFORE REGISTERING FOR THE COURSE.

Anthropology:

APY345—Comparative Primate Anatomy
APY 348—Forensic Anthro Osteology
APY 349—Human Genetics

Biochemical Pharmacology:

BCP302—Introduction to Pharmacology
BCP405—Principles of Pharmacology

Biochemistry:

BCH403—Principles of Biochemistry

Biological Sciences:

All 200 level and above Biology lecture courses will fulfill the technical elective requirement

Biophysics:

BPH303—Principles of Biophysics

Chemical Engineering:

Revised 8/1/2024

All 200 level and above Chemical Engineering lecture courses will fulfill the technical elective requirement.

Computer Science:

All 200 level and above Computer Science lecture courses will fulfill the technical elective requirement.

Engineering & Applied Sciences (EAS):

All 200 level and above Engineering & Applied Sciences lecture courses will fulfill the technical elective requirement.

Geography:

GEO200—The Ocean World
GEO201—Disasters: A Study of Hazards
GEO347—Climatic Geomorphology
GEO348—Landform Development
GEO352—Introduction to Soils
GEO355—Landscape Ecology

Geological Sciences:

GLY205—Mineralogy, Geochemistry & Petrology I
GLY206—Mineralogy, Geochemistry & Petrology II
GLY215—Soft Rock I: Sedimentology
GLY216—Soft Rock II: Paleontology & Stratigraphy

Mathematics:

MTH241—College Calculus III (ONLY FOR THE BA PROGRAM)
All 200 level and above mathematics lecture courses will fulfill the technical elective requirement, however, a student cannot, for example, use MTH242 as an advanced math course (BS program) *and* as a technical elective. In other words, taking the course once will not fulfill two requirements.

Medical Technology:

MT 401— Clinical Biochemistry
MT 402—Clinical Immunology
MT 428 —Forensic Science

Medicinal Chemistry:

MCH311—The Chemistry of Drug Action
MCH401— Drug Discovery Principles
MCH 402—Principles of Med Chem 2
MCH403—Mechanisms of Drug Action
MCH427—Combinatorial Chemistry

Physics:

All 200 level and above Physics lecture courses will fulfill the technical elective except for PHY311.

Physiology:

PGY300—Human Physiology

Psychology:

PSY207—Psychological Statistics

Statistics:

STA401—Probability

STA402—Statistical

MCH **B.S. Degree:** For the MCH B.S. degree, 15 credit hours of science electives are required. Broadly speaking, these are any 3 credit or more lecture courses, sophomore (200) level or higher in a technical area other than chemistry. Required courses cannot be used as technical electives. The courses listed below are approved electives.

Anthropology:

APY345—Comparative Primate Anatomy

Biological Sciences:

All 200 level and above Biology lecture courses will fulfill the technical elective requirement

Chemistry:

Any course not already required.

Geological Sciences:

GLY462—Aqueous Geochemistry

Mathematics:

All 200 level and above mathematics lecture courses will fulfill the technical elective requirement.

Medicinal Chemistry:

Any course not already required.

Medical Technology:

MT 401— Clinical Biochemistry

MT 402—Clinical Immunology

MT 428 —Forensic Science

Physics:All 200 level and above Physics lecture courses.**Physiology:**

PGY300—Human Physiology

PGY 451-452

Psychology:

PSY207—Psychological Statistics

Students may request (by petition to the Department's Undergraduate Committee) for a course to be added to the list of approved technical electives.

Curricular Plan for BA Degree in Chemistry

Freshman Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
UB Seminar	UBS	3
CHE 101 or 105 or 107	M/SLI 1	4
CHE 113 or 127	M	1
MTH 141 or 121	M/MQR	4
Pathway or ENG 105	P or CL 1	3 or 4
<i>Total Credits:</i> 15 or 16		

Freshman Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 102 or 106 or	M	4
CHE 114 or 128	M	1
MTH 142 or 122	M	4
Pathway	P	3
Pathway or ENG 105	P or CL 1	3 or 4
<i>Total Credits:</i> 15 or 16		

*CHE101 or 105 count towards both M & SLI 1. MTH141 or 121 count towards both M & MQR.

Sophomore Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 203	M	3
CHE 205	M	2
CHE 314	M	3
Pathway	P	3
PHY 107 or 101&151	M/SLI 2	4
<i>Total Credits:</i> 15		

Sophomore Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 204	M	3
CHE 206	M	2
CHE 315	M	2
Pathway	P	3
PHY 108 & 158 or PHY 102&152	M	5
<i>Total Credits:</i> 15		

*PHY 107 counts towards both M & SLI 2.

Junior Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 349	M	3
CHE 321	M	3
CHE LAB	M	2
CHE LAB		2
Pathway	P	3
Communication Literacy	CL 2	3
<i>Total Credits:</i> 16		

Junior Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
Elective	M	3
Diversity Learning	DL*	3
Elective	E	3
Pathway	P	3
Technical Elective	M	3
UBC 399	CAP	1
<i>Total Credits:</i> 16		

*Approved Diversity Learning course if not met through approved major, elective, or UBC course.

Senior Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
Technical Elective	M	3
Elective	E	3
Elective	E	3
Elective	E	3
Elective	E	3
<i>Total Credits:</i>		15

Senior Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
Elective	E	3
Elective	E	3
Elective	E	3
Technical Elective	M	3
<i>Total Credits:</i>		12

Total Credits Required for Degree:	120
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** Physical Chemistry: For the BA degree, students may elect to complete the Physical Chemistry requirement by either completing the one semester lecture course CHE349 “Physical Chemistry for Life Sciences” or the two-semester lecture course CHE319-320 “Physical Chemistry I and II”. If students elect to enroll in CHE319-320 THEY MUST COMPLETE BOTH SEMESTERS, no substitutions allowed.

Category Legend:

CAP - UB Capstone

CL1/CL 2 - Communication Literacy 1/2

DL - Diversity Learning

E - Elective (not required for major or UB Curriculum)

GP1/GP2/GP3 - Global Pathway Course 1/2/3

M - Major requirement (including pre-requisites needed for admission to the major)

MQR - Math and Quantitative Reasoning

SLI1/SLI2 - Scientific Literacy and Inquiry 1/2

TP1/TP2/TP3 - Thematic Pathway Course 1/2/3

UBS - UB Seminar

Note: Some classes may count toward both a major (M) and UB Curriculum (UBC) requirement

Curricular Plan for BS Degree in Chemistry

Freshman Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
UB Seminar	UBS	3
CHE 101 or 107 or 105	M/SLI 1	5
MTH 141	M/MQR	4
PHY 107	M/SLI 2	4
<i>Total Credits:</i>		16

Freshman Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
ENG 105	CL 1	4
CHE 102 or 108 or 106	M	5
MTH 142	M	4
PHY 108 & 158	M	5
<i>Total Credits:</i>		18

Sophomore Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 203&205 or 251	M	5
CHE 314	M	3
Pathway	P	3
MTH 241	M	4
<i>Total Credits:</i>		15

Sophomore Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 204&206 or 252	M	5
CHE 315	M	3
Pathway and Diversity Learning	P/DL*	3
Pathway	P	3
Pathway	P	3
<i>Total Credits:</i>		16

Junior Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 319	M	3
CHE 321	M	3
CHE 300-level Lab	M	3
CHE 329	M	2
MTH 306 or 309	M	4
<i>Total Credits:</i>		15

Junior Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 320	M	3
CHE 322	M	3
CHE 312	M	3
CHE 376	M	3
Communication Literacy	CL 2	3
<i>Total Credits:</i>		15

Senior Year – Fall Semester		
Course	Category	Credits
CHE 413	M	3
Elective	E	3
Pathway	P	3
Pathway	P	3
UBC 399	CAP	1
<i>Total Credits:</i>		13

Senior Year – Spring Semester		
Course	Category	Credit
CHE 414	M	1
CHE 400-Level Elective	M	3
Elective	E	3
Elective	E	2
Technical Elective	M	3
<i>Total Credits:</i>		12

Total Credits Required for Degree:

120

Category Legend:

M = Course Required for Major (including pre-requisites needed for admission to the major)

E= Elective (course not required for major or UB Curriculum)

The following are all components of the UB Curriculum (UBC) For more information on the UBC and course options visit:

<https://catalog.buffalo.edu/policies/ubcurriculum.html>

•UBS = UB Seminar

•CL1/CL 2 = Communication Literacy (2 required)

•CAP = UB Capstone

•DL = Diversity Learning

•MQR = Math and Quantitative Reasoning

•P = Pathway Course (6 required: 3 Global, 3 Thematic)

•SLI1/SLI2 = Scientific Literacy and Inquiry (2 required)

Note: Some classes may count toward both a major (M) and UB Curriculum (UBC) requirement.

Curricular Plan for BS Degree in Medicinal Chemistry

Freshman Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
UB Seminar	UBS	3
CHE 101&113 or 105	M/SLI 1	5
MTH 141	M/MQR	4
Pathway or ENG 105	P or CL 1	3 or 4
<i>Total Credits:</i> 15 or 16		

Freshman Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 102&114 or 106	M	5
MTH 142	M	4
PHY 107	M/SLI 2	4
Pathway or ENG 105	P or CL 1	3 or 4
<i>Total Credits:</i> 16 or 17		

Sophomore Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 203&205 or 251	M	5
CHE 314	M	3
PHY 108	M	4
PHY 158	M	1
Pathway	P	3
<i>Total Credits:</i> 16		

Sophomore Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 204 &206 or 252	M	5
CHE 315	M	2
BIO 201 & 211	M	4
Pathway	P	3
Pathway	P	3
<i>Total Credits:</i> 17		

Junior Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 319	M	3
CHE 321	M	3
CHE 301	M	3
Pathway	P	3
Communication Literacy	CL 2	3
<i>Total Credits:</i> 15		

Junior Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 320	M	3
Diversity Learning	DL*	3
CHE 312	M	3
CHE 322	M	3
Elective	E	3
<i>Total Credits:</i> 15		

Senior Year – Fall Semester		
Course	Category	Credit
MCH 401	M	3
MCH 498	M	2
Technical Elective	M	3
Technical Elective	M	3
UBC 399	CAP	1
<i>Total Credits:</i>		12

Senior Year – Spring Semester		
Course	Category	Credit
CHE 455	M	3
Technical Elective	M	3
Technical Elective	M	3
Elective	E	2
Technical Elective	M	3
<i>Total Credits:</i>		14

Total Credits Required for Degree:	120
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**Approved Diversity Learning course if not met through approved major, elective, or UBC course.*

Category Legend:

M = Course Required for Major (including pre-requisites needed for admission to the major)

E = Elective (course not required for major or UB Curriculum)

The following are all components of the UB Curriculum (UBC) For more information on the UBC and course options visit: <https://catalog.buffalo.edu/policies/ubcurriculum.html>

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- CAP = UB Capstone
- DL = Diversity Learning
- P = Pathway Course (6 required: 3 Global and 3 Thematic)
- MQR = Math and Quantitative Reasoning
- SLI1/SLI2 = Scientific Literacy and Inquiry (2 required)

Note: Some classes may count toward both a major (M) and UB Curriculum (UBC) requirement.

Courses that count towards more than one requirement are indicated by a "/" (slash) in the category column indicating which categories the course will satisfy.

Curricular Plan for the Combined BS/MS Degree in Medicinal Chemistry

First Year – Fall Semester		
Course	Category	Credit
UB Seminar	UBS	3
CHE 101 or 105	M/SLI 1	5
MTH 141	M/MQR	4
Pathway or ENG 105	P or CL 1	3 or 4
<i>Total Credits:</i> 15 or 16		

First Year – Spring Semester		
Course	Category	Credit
CHE 102 or 106	M	5
MTH 142	M	4
PHY 107	M/SLI 2	4
Pathway or ENG 105	P or CL 1	3 or 4
<i>Total Credits:</i> 16 or 17		

Second Year – Fall Semester		
Course	Category	Credit
CHE 201 or 251	M	5
CHE 214	M	3
PHY 108	M	4
PHY 158	M	1
Pathway and Diversity Learning	P/DL*	3
<i>Total Credits:</i> 16		

Second Year – Spring Semester		
Course	Category	Credit
CHE 202 or 252	M	5
CHE 215	M	2
BIO 201	M	4
Pathway	P	3
Pathway	P	3
<i>Total Credits:</i> 17		

Third Year – Fall Semester		
Course	Category	Credit
CHE 319	M	3
CHE 321	M	3
CHE 301	M	3
CHE 329	M	2
Pathway	P	3
<i>Total Credits:</i> 14		

Third Year – Spring Semester		
Course	Category	Credit
CHE 320	M	3
CHE 455	M	3
CHE 312	M	3
Communication Literacy	CL 2	3
<i>Total Credits:</i> 12		

Fourth Year – Fall Semester		
Course	Category	Credit
MCH 501	M	3
MCH 498	M	3
UBC 399	CAP	1
Pathway	P	3
CHE 501	M	3
<i>Total Credits:</i>		13

Fourth Year – Spring Semester		
Course	Category	Credit
MCH 498	M	3
Elective	E	3
Technical Elective	M	3
Grad Science Elective	M	3
Grad Science Elective	M	3
<i>Total Credits:</i>		15

Fifth Year – Fall Semester		
Course	Category	Credit
Grad Science Elective	M	3
MCH 615	M	6
<i>Total Credits:</i>		9

Fifth Year – Spring Semester		
Course	Category	Credit
Grad Science Elective	M	3
MCH 616	M	6
MCH 700	M	1
<i>Total Credits:</i>		10

Total Credits Required for Degree:	131
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**Approved Diversity Learning course if not met through approved major, elective, or UBC course.*

Category Legend:

M = Course Required for Major (including pre-requisites needed for admission to the major)

E = Elective (course not required for major or UB Curriculum)

The following are all components of the UB Curriculum (UBC) For more information on the UBC and course options visit:

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- CAP = UB Capstone
- DL = Diversity Learning
- P = Pathway Course (6 required: 3 Global and 3 Thematic)
- MQR = Math and Quantitative Reasoning
- SLI1/SLI2 = Scientific Literacy and Inquiry (2 required)

Note: Some classes may count toward both a major (M) and UB Curriculum (UBC) requirement. Courses that count towards more than one requirement are indicated by a "/" (slash) in the category column indicating which categories the course will satisfy.

Curricular Plan for Chemistry BA/Chemistry Adolescence Education EdM

Freshman Year – Fall Semester		
Course	Category	Credit
CHE 101LLR General	M/SLI1	4
CHE 113LAB General	M/SLI1	1
MTH 121LR Surv	M/MQR	4
UB Seminar	UBS	3
ENG 105LEC Writing and Rhetoric	CL1	4
Total Credits: 16		

Freshman Year – Spring Semester		
Course	Category	Credit
CHE 102LLR General	M/SLI2	4
CHE 114LAB General	M	1
MTH 122LR Surv	M	4
Pathway	P	3
LAI 350LEC	M	4
Total Credits: 16		

Sophomore Year – Fall Semester		
Course	Category	Credit
CHE 203LEC Organic	M	3
CHE 205LBR Organic	M	2
CHE 314 Analytical	M	3
PHY 101LR College	M	4
PHY 151LAB College	M	1
Pathway	P	3
Total Credits: 16		

Sophomore Year – Spring Semester		
Course	Category	Credit
CHE 204LEC	M	3
CHE 206LBR	M	2
CHE 315 Analytical	M	2
PHY 102LR College	M	4
PHY 152LAB College	M	1
ELP 405LEC	M	3
Pathway	P	3
Total Credits: 18		

Junior Year – Fall Semester		
Course	Category	Credit
4 Credit Hours of: CHE 301, CHE 322, CHE 329, CHE 330, or CHE 350	M	4
CHE 321LEC	M	3
CHE 349LEC	M	3
Elective (300-400)	M	3
Pathway	P	3
Pathway	P	3
Total Credits: 19		

Junior Year – Spring Semester		
Course	Category	Credit
CEP 400LEC	M	3
Science or Math	M	3
Science or Math	M	3
Communication	CL2	3
UBC 399	CAP	1
Pathway/Diversity	DIV/P	3
Total Credits: 16		

Senior Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
500-level Chemistry	M	3
500-level Chemistry	M	3
LAI 474SEM	E*	3
LAI 619LEC	M	3
LAI 552LEC	M	3
Total Credits: 15		

Senior Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
LAI 531LEC	M	3
500-level Chemistry	M	3
500-level Chemistry	M	3
LAI 414LEC	E*	3
LAI 603LEC	M	3
Total Credits: 15		

Fifth Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
LAI 533SEM	M	3
LAI 619LEC	M	3
LAI 667TUT	M	3
LAI 668TUT	M	3
LAI 698SEM	M	3
Total Credits: 15		

Fifth Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
LAI 595TUT	M	6
LAI 534LEC	M	3
LAI 674TUT	M	3
LAI 700 Capstone	M	1
Total Credits: 13		

Total Credits Required for Degree:	156
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Category Legend:

M = Course Required for Major (including pre-requisites needed for admission to the major)

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- CAP = UB Capstone
- DL = Diversity Learning
- P = Pathway Course (6 required: 3 Global and 3 Thematic)
- MQR = Math and Quantitative Reasoning
- SLI1/SLI2 = Scientific Literacy and Inquiry (2 required)

Note: Some classes may count toward both a major (M) and UB Curriculum (UBC) requirement. Courses that count towards more than one requirement are indicated by a "/" (slash) in the category column indicating which categories the course will satisfy.

Curricular Plan for Chemistry BA/PharmD

Freshman Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
BIO 200LLB	M/SLI1	5
CHE 101 & CHE 113 Lab or CHE 105LLR	M/SLI2 or M	5 or 5
ENG 105	CL1	4
UB Seminar	UBS	3
Total Credits: 17		

Freshman Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
BIO 201LEC	M	3
BIO 211LAB	M	1
CHE 102LLR & CHE	M	5
MTH 121LR	M/MQR	4 or 4
Pathway/Diversity	DIV/P	3
Pathway	P	3
Total Credits: 19		

Sophomore Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 203/CHE 205 or CHE 251	M or M	5 or 5
MTH 122 or MTH 142	M or M	4 or 4
PHY 101 & PHY 151 or PHY 107LR	M or M	5 or 4
PGY 451LEC	M/P	3
Total Credits: 16 or 17		

Sophomore Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 204/CHE 206 or CHE 252	M or M	5 or 5
CHE 314	M	3
PHY 102 or PHY 108	M or M	4 or 4
PHY 152 or PHY 158	M or M	1 or 1
PGY 452LEC	M	3
Total Credits: 16		

Junior Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
BCH 403LEC	M	4
CHE 321LEC	M	3
CHE 349LEC	M	3
CHE 315Lab	M	2
Communication Lit II	CL2	3
Pathway	P	3
Total Credits: 18		

Junior Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
PAS 313LLB	M	4
CHE 322LLB	M	3
MIC 401	M/P	4
STA 119 or PSY 207LLB or SOC 294LR	M or M or M	4 or 4 or 4
Pathway	P	3
UBC 399	CAP	1
Total Credits: 19		

Senior Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
PHC 501LR	M	3
PHC 529LR	M	3
PHM 503LEC	M	3
PHM 505LAB	M	1
PHM 515LLB	M	3
PHM 577LEC	M	1
PMY 511LEC	M	4
PHM 555	M	0
Total Credits: 18		

Senior Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
PHC 530LEC	M	3
PHM 501LEC	M	2
PHM 504LEC	M	3
PHM 506LAB	M	1
PHM 516LLB	M	2
PHM 578LEC	M	1
PHM 530LR	M	3
PMY 512LEC	M	4
PHM 555CON	M	0
Total Credits: 19		

Fifth Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
PHC 531LR	M	3
PHM 600LEC	M	1
PHM 601LEC	M	3
PHM 602LEC	M	2
PHM 615LLB	M	1
PHM 637LEC	M	3
PHM 651 & Lab	M	4
PHM 681TUT	M	1
PHM 555CON	M	0
Total Credits: 18		

Fifth Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
PHC 532LR	M	3
PHM 603LEC	M	3
PHM 604LEC	M	2
PHM 606LEC	M	3
PHM 616LAB	M	1
PHM 652 & Lab	M	4
PHM 682TUT	M	1
PHM 555CON	M	0
Total Credits: 17		

Sixth Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
PHC 517LEC	M	2
PHM 701LEC	M	3
PHM 702LEC	M	3
PHM 706LEC	M	2
PHM 715LLB	M	1
PHM 729LEC	M	2
PHM 781TUT	M	3
PHM 555CON	M	0
Electives	E*	3
Total Credits: 19		

Sixth Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
PHM 703LEC	M	2
PHM 704LEC	M	2
PHM 705LEC	M	2
PHM 716LAB	M	1
PHM 730LR	M	1
PHM 736LEC	M	2
PHM 782TUT	M	3
PHM 555CON	M	0
Electives	E*	5
Total Credits: 18		

Seventh Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
PHM 483	M	6
PHM 844	M	4
PHM 845	M	4
PHM 846	M	6
PHM 847 Elective 1	M	6
PHM 848 Elective 2	M	6
PHM 849 Elective 3	M	4
PHM 850	M	1
Total Credits: 37		

Total Credits Required for Degree:	251
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Category Legend:

M = Course Required for Major (including pre-requisites needed for admission to the major)

E = Elective (course not required for major or UB Curriculum)

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- CAP = UB Capstone
- DL = Diversity Learning
- P = Pathway Course (6 required: 3 Global and 3 Thematic)
- MQR = Math and Quantitative Reasoning
- SLI1/SLI2 = Scientific Literacy and Inquiry (2 required)

Note: Some classes may count toward both a major (M) and UB Curriculum (UBC) requirement. Courses that count towards more than one requirement are indicated by a "/" (slash) in the category column indicating which categories the course will satisfy.

Curricular Plan for Chemistry BS/Materials Design and Innovation MS

Freshman Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
UB Seminar	UBS	3
CHE 101&113	M/SLI 1	5
MTH 141	M/MQR	4
PHY 107	M/SLI 2	4
<i>Total Credits:</i>		16

Freshman Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
ENG 105	CL 1	4
CHE 102 & 114	M	5
MTH 142	M	4
PHY 108 & 158	M	5
<i>Total Credits:</i>		18

Sophomore Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 203&205 or 251	M	5
CHE 314	M	3
Thematic Pathway	P	3
Pathway and Diversity Learning	P/DL*	3
MTH 241	M	4
<i>Total Credits:</i>		18

Sophomore Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 204&206 or 252	M	5
CHE 315	M	3
Global Pathway	P	3
Global Pathway	P	3
Thematic Pathway	P	3
<i>Total Credits:</i>		16

Junior Year – Fall Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 319	M	3
CHE 321	M	3
CHE 329 Lab	M	2
Global Pathway	P	3
MTH 309	M	4
<i>Total Credits:</i>		15

Junior Year – Spring Semester		
<i>Course</i>	<i>Category</i>	<i>Credit</i>
CHE 320	M	3
CHE 322	M	3
CHE 312	M	3
CHE 376	M	3
CHE 330	M	2
Communication Literacy	CL 2	3
<i>Total Credits:</i>		17

Senior Year – Fall Semester		
Course	Category	Credit
CHE 413	M	3
300/400 level Elective	E	2
UBC 399	CAP	1
MDI 501	M	3
MDI 502	M	3
MDI 503	M	3
MDI 507	M	3
<i>Total Credits:</i>		18

Senior Year – Spring Semester		
Course	Category	Credit
MDI 504	M	3
MDI 505	M	3
MDI 506	M	3
MDI 508	M	3
<i>Total Credits:</i>		12

Fifth Year – Fall Semester		
Course	Category	Credit
MDI 700TUT	E	3
Elective	E	3
Elective	E	3
<i>Total Credits:</i>		6

Category Legend:

M = Course Required for Major (including pre-requisites needed for admission to the major)

E = Elective (course not required for major or UB Curriculum)

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- DL = Diversity Learning
- P = Pathway Course (6 required: 3 Global and 3 Thematic)
- MQR = Math and Quantitative Reasoning
- SLI1/SLI2 = Scientific Literacy and Inquiry (2 required)

Note: Some classes may count toward both a major (M) and UB Curriculum (UBC) requirement. Courses that count towards more than one requirement are indicated by a "/" (slash) in the category column indicating which categories the course will satisfy.

General Education Requirements

Component	Credit hours
First Year or Transfer Seminar	3 or 1
Communication Literacy 1	4
Communication Literacy 2	3
Quantitative Reasoning	4
Scientific Literacy and Inquiry	7
Thematic Pathway	9
Global Pathway	9
Integrative Capstone	1

UB Seminar

UB Seminar Transfer students entering UB will enroll in the one-credit UB Seminar. All first year students will take the three-credit UB Seminar.	3 or 1 credits
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Domestic transfer students entering UB with 45 or more credits will enroll in the one-credit UB Seminar. All others will take the three-credit UB Seminar. 3 or 1 credits

[Learn more about the UB Seminar.](#)

Foundations

Courses in diversity, writing, math and natural sciences that promote critical thinking, creative problem-solving, enhanced communication skills, cultural competencies, and ethical and analytical reasoning.

Communication Literacy 1	4 credits
Communication Literacy 2	3 credits
Math and Quantitative Reasoning	4 credits
Scientific Literacy and Inquiry Sequence	7 credits
Diversity in the United States Requirement	Satisfied within the Pathways

[Learn more about Foundations.](#)

Pathways

A series of courses interconnected by theme or concept across a wide range of disciplines. Pathways can be customized to complement pre-existing interests or designed to expand horizons and engage curiosity.

Thematic Pathway	9 credits
Global Pathway	9 credits

[Learn more about pathways](#)

Capstone

A final project that integrates the whole in anticipation of next steps in life and learning.

Capstone	1 credit
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[Learn more about the Capstone.](#)

Graduation

Application for Degree:

Undergraduate students must apply for graduation via the HUB Student Center (<http://www.myub.buffalo.edu>). The deadlines are:

Application Deadline

July 15th

October 15th

February 22nd

For Graduation On:

September 1st (Summer)

February 1st (Fall)

June 1st (Spring)

Double Degree Candidates (i.e. BS and BA, two degrees awarded at one time) must also submit the Double Degree Application (registrar.buffalo.edu/pdfs/doubleDegree.pdf)

Make sure your name and addresses are up to date in your HUB Student Center. Your name and address as it appear in HUB at the time of the conferral date is how your diploma will be processed.

Settlement of Obligation:

All balances on your student account must be paid in full to be eligible for graduation. Students must also satisfy any financial obligations incurred in connection with student activities and return all books belonging to the Libraries. Diplomas will be sent only when all financial obligations to the University have been met.

Commencement:

The “Countdown to Commencement” page ([Commencement - Commencement - University at Buffalo](#)) contains all the information you need for the big day. A checklist guides you step-by-step through sign-up requirements and contact information for everything from ordering your cap and gown to obtaining tickets for friends and family. Be sure to start visiting this site a semester or two prior to your expected conferral date to make sure you are ready!

The Chemistry Department participates in the commencement for the College of Arts & Sciences. Immediately following commencement, the chair hosts an awards ceremony and reception in the Natural Sciences Complex.



ACS Certified

American Chemical Society Certification of Chemistry Majors

The program of the Chemistry Department is approved by the American Chemical Society. Students taking the complete B.S. program offered by the Chemistry Department are certified as American Chemical Society Chemistry Majors. Such certification may be included in their credentials when applying for employment or graduate school following graduation and allows them to join the American Chemical Society without the usual annual probationary period of membership. Being certified may enhance a student's credentials for obtaining an industry position.

Undergraduate Research Opportunities

[Join a \(free!\) UB learns course](#) designed to help Chemistry students learn more about Research Opportunities for chemistry.

Questions?

Contact Dr. Samanta

satamita@buffalo.edu

All chemistry and medicinal chemistry majors are encouraged to participate in undergraduate research. To get started, review the “**Faculty Research**” section of the Chemistry Department website (arts-sciences.buffalo.edu/chemistry/research/research-areas). Then simply make appointments with faculty whose research areas interest you to discuss the possibilities. Choose three or four faculty since often their research laboratories are full and their individual policies concerning undergraduate research vary widely.

Having received the faculty member’s permission to enroll in their program you must be force registered into **CHE290** (1 credit) if you are a sophomore, or CHE498 (1-3) credits or **MCH498** (1-6) credits if you are a junior or senior. Instructions for force registration are on our website ([Undergraduate Courses - Department of Chemistry - University at Buffalo](#)). Most chemistry and medicinal chemistry majors do research in one or both semesters of their senior year.

The Experiential Learning Network is the University at Buffalo's central resource for hands-on learning. You can access the [Project portal](#) to explore possible Chemistry research opportunities. The Project Portal and ELN Digital Badges are designed to help you find the best opportunities to build experience for your career and demonstrate your skills to future employers and graduate schools.



Interdisciplinary Research Activities

Chemistry is frequently referred to as the “Central Science”. Department of Chemistry faculty are at the center of many interdisciplinary research efforts including the Institute for Lasers, Photonics and Biophotonics; the Center for Computational Research; the Structural Biology initiative and the Surface Science Center. Undergraduate chemistry majors may conduct research in a number of interdisciplinary areas; some recent areas that chemistry undergraduates have partaken for research includes chemical engineering, physics, biological sciences, biochemistry, pharmacy, biomedical sciences, psychology, and geology.



Facilities

The University Libraries

Your Chemistry and Sci/Tech Librarians

The key chemical information resource within the University at Buffalo (UB) Libraries is your [chemistry librarian](#). The chemistry librarian assists students and faculty with reference queries, [scholarly publishing](#) issues, multidisciplinary in-depth searching, and [workshops](#) as well as expert help in searching [Scifinder](#), the core chemistry database from Chemical Abstracts Service. Please contact the chemistry librarian with any questions you have about library resources and services, or for help with finding documents, property data, or other information you need.

An entire team of science and engineering librarians is available to serve you in our [Science & Engineering Information Center](#) (SEIC) located on the first floor of the [Lockwood Memorial Library](#), accessible by an elevator in the [Cybrary](#) across the hall from the main library entrance or a glass-enclosed stairwell inside the main entrance and immediately to one's left. We can be contacted by phone or email and are always glad to set up appointments with students so we can work one-on-one with them.

A complete [library staff directory by subject areas](#) (disciplines) is also available.

Services

Our [Student Support](#) page describes many services including [library hours](#), [floor plans](#), and other resources. Many questions about the library and UB can be answered by querying our [Help A-Z](#) database. Professional librarians from UB and other universities provide a [24x7 chat reference](#) service.

Our science and engineering librarians have expertise in many areas including citation management software, property data sources, citation metrics, GIS data, maps, and finding so-called grey literature (patents, technical reports, dissertations and theses, standards, conference papers, and government documents).

The University Libraries provides a site-wide license to a superb citation management/writing tool, [EndNote](#), and holds many hands-on training sessions on its use each semester.

Collections

The [University Libraries](#) provide access to almost 4.2 million volumes including more than 790,000 electronic books and 101,000 unique journal title subscriptions, the largest within SUNY. Many millions of searches and full-text article downloads are handled by our [website](#) each year.

Major [electronic resources in chemistry](#) are available to you including [SciFinder](#), [Web of Science](#), and all [American Chemical Society](#), [Wiley](#), and [Elsevier](#) journals as well as many [Royal Society of Chemistry journals](#). Our SEIC print reference collection is housed within SEIC (1st Floor Lockwood Memorial Library) while our circulating books are on the third floor of Lockwood. Increasingly we are purchasing books in electronic form rather than print. Browsing only our print books on our library shelves will give you an incomplete and often dated picture of all the book materials available to you.

SEIC has an extensive group study area with large tables and windows. There are many additional group and quiet study areas as well as [public computing stations](#) in Lockwood Library and [Silverman \(Capen\) Library](#) as well as other libraries in our system including the [Health Sciences Library](#) on the South Campus.

All print and electronic material available to the UB community can be accessed via our [library catalog](#), including books, journals (not journal articles), indices and abstracts, technical reports, standards, theses, and dissertations. If you have a specific reference to a journal article, first search our [electronic journals database](#) by journal title. For author, compound, reaction, and keyword searching, use a database such as [SciFinder](#). If you cannot readily find the full-text of any item you need, please use our free [Delivery+ service](#) described below.

Document Delivery

The UB Libraries' free [Delivery+ service](#) allows students to request any item from any UB library, including our off-site Annex, or from thousands of academic libraries with which we have borrowing agreements. Any item within the UB Libraries' system will be delivered to you within 24 business hours, usually electronically for articles, conference papers, and book chapters or, for books, to a circulation desk of your choosing. Materials from other libraries typically arrive in 2-7 business days, typically in electronic form except for whole books.

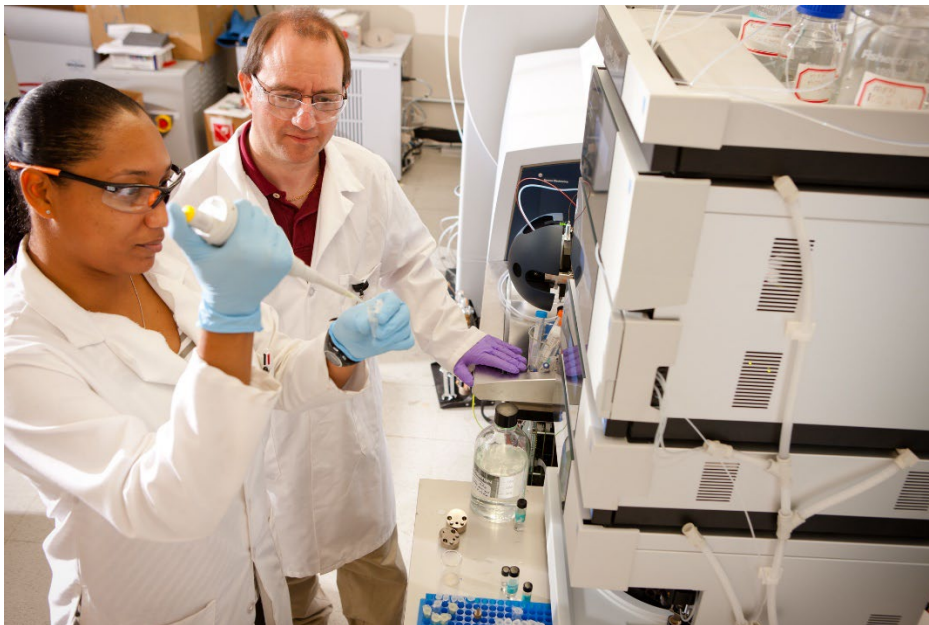
Computer Resources

The University maintains a number of public computing sites:

- Capen Cybrary: Undergraduate Library (north & south), Science & Engineering Library.
- Bell Hall Room 101
- Blake Center
- Clement 128 (south campus)
- Clinton 114
- Fronczak Hall Room 408
- Health Sciences library (south campus)
- Lockwood Cybrary 2nd and 3rd floors.

More information about the public computing sites and their use can be found at: <http://ubit.buffalo.edu/sites/>

In addition to University sites, the Department of Chemistry maintains a number of PCs for use in certain courses and all research groups in the Department also have computer facilities available to students conducting research in their groups.



Chemistry Instrumentation

The Chemistry Department Instrument Center maintains and operates a number of instruments that facilitate a variety of research. These include multiple mass spectrometers for analysis of ions in gas, solution and solid phases, including accurate mass confirmation. Liquid and gas chromatographs are coupled with mass spectrometry to enhance mixture analysis. Ionization techniques include electron impact, electrospray, and chemical ionization. Instrumentation is updated regularly, and specific instruments in the Center include: Thermo Fisher Q-Exactive Liquid Chromatograph Orbitrap Tandem Mass Spectrometer, Thermo Fisher Linear Ion Trap (LTQ) Mass Spectrometer, ThermoElectron X Series 2 Inductively Coupled Plasma Mass Spectrometer, and a Thermo Scientific Q-Exactive Orbitrap Gas Chromatography/Tandem Mass Spectrometer.

These instruments were purchased through funding by the National Science Foundation. Other techniques available for walk-up use include FTIR, thermogravimetric analysis, scanning spectrophotometry, and differential scanning calorimetry.

The Chemistry Department also has a Magnetic Resonance Center which houses Nuclear Magnetic Resonance spectrometers include Varian Inova 400, 500 and Bruker Neo 400 and 500 MHz NMR spectrometers for state-of-the-art structure studies. An EMX 390 electron spin resonance spectrometer is also located in the Magnetic Resonance Center.

Fellowship Opportunities

Fulbright Grants—These grants are for study for one year in a foreign country. A project proposal is required and will be judged on the basis of its creativity and ability to be completed in the one year of study.

Luce Scholarships—The Luce Scholarship provides one year of living and working in an Asian culture. These scholarships stipulate that the candidates must not have previously studied in the Far East. They are intended to provide a familiarity with Asian culture for Americans with leadership potential.

National Science Foundation—The competition is open to seniors who plan to attend graduate school in natural sciences, engineering or social sciences. The submission of a research proposal is a major component to this application. Prior research work is important.

Rotary Fellowships—The grants are provided by the Rotary Clubs and fund one year of study in any country where a Rotary Club is located. Applicants must have at least completed their sophomore year.

Rhodes Scholarships—The 32 scholarships awarded annually are for two or three years of study in any field at Oxford University, England. Students completing their junior or senior year may apply.

Awards & Honors

***Above is just a sampling of fellowship opportunities. Please visit the University at Buffalo's "Fellowships & Scholarships" website (<http://fellowships.buffalo.edu/>) for information on many more and aids to help you present a well polished application.

Academic Excellence in Chemistry—The Academic Excellence in Chemistry Award consists of a keepsake plaque given by the Department of Chemistry. It is given annually to graduating seniors with the following GPA levels: Distinction—3.20-3.499; High Distinction—3.50-3.749; Highest Distinction—3.75-4.00.

Academic Excellence in Medicinal Chemistry—The Academic Excellence in Medicinal Chemistry Award consists of a keepsake plaque given by the Department of Chemistry. It is given annually to graduating seniors with the following GPA levels: Distinction—3.20-3.499; High Distinction—3.50-3.749; Highest Distinction—3.75-4.00.

American Institute of Chemists Award—One of the activities of the American Institute of Chemists Foundation (AICF), administered by the American Institute of Chemists (AIC), is the annual student awards program to honor outstanding seniors, post-baccalaureate and post-doctoral students majoring in chemistry, chemical engineering or biochemistry. Such awards are given in recognition of a demonstrated record of ability, leadership and professional promise. Candidates are nominated by Department

faculty members and selected by the Department's Undergraduate Affairs Committee. A certificate is presented at the annual Department awards ceremony.

College of Arts & Sciences Dean's Outstanding Senior Award—Annually, the Dean honors the best senior graduating from each department in the College of Arts and Sciences (CAS) with the “Dean's Outstanding Senior Award”, consisting of a medal and certificate presented at the University Commencement ceremony. In previous years, prior to the formation of the College of Arts and Sciences, this award was named the “College of Arts and Sciences Deans Outstanding Senior Award”. Each department in the College, along with the Interdisciplinary Degree Program and the Special Major program, is asked to select one graduating senior. The selection criteria are: (a) demonstrated academic excellence exemplified by an exceptional grade point average, (b) election to honor societies, (c) participation in research, and (d) other academic achievements selected by the department.

ACS Undergraduate Award In Inorganic Chemistry—The American Chemical Society established this award in 2009 and is intended to recognize achievement by undergraduate students in inorganic chemistry and to encourage further study in the field. The recipient is selected by the Undergraduate Affairs Committee, and the award consists of a personalized certificate and a letter of commendation signed by the Chair of the ACS Division of Inorganic Chemistry.

ACS Undergraduate Award In Organic Chemistry—The American Chemical Society established this award and is intended to recognize achievement by undergraduate students in organic chemistry and to encourage further study in the field. The recipient is selected by the Undergraduate Affairs Committee, and the award consists of a personalized certificate and a letter of commendation signed by the Chair of the ACS Division of Organic Chemistry.

Phi Beta Kappa Omicron Chapter of NY—Minimal requirements for nomination are 85 credits with a minimum QPA of 3.75 or 100 credits with a minimum QPA of 3.5, with at least 60 UB credits. All transfer work is considered. Additionally, each student is evaluated for excellence both in depth (defined as excellence in their chosen liberal arts major) and breadth (defined as excellence in the equivalent of UB's general education program) in liberal studies.

Phi Lambda Upsilon—(Honorary Chemical Society)—Qualifications: Senior standing with 30 hours of chemistry, chemical engineering and/or biochemistry completed; rank in the top 20% of seniors in their department or at their University, and possession of a minimum grade point average of 3.5/4.0. National Office will make direct contact with students nominated and extend an invitation to them with an indication of department's nomination.

Western New York American Chemical Society Award—Through its generosity the Western New York Section of the American Chemical Society (founded in 1905) offers this annual award to honor the outstanding senior students of our regional colleges and universities majoring in chemistry, medicinal chemistry and biochemistry. Presentation

of the award is made at a regularly scheduled section meeting of the WNY/ACS, where the awardees (one each for chemistry and medicinal chemistry) are guests for dinner and receive an appropriate certificate and one year's paid membership in the ACS.

Ralph F. Theuer Scholarship Award—The family of Ralph F. Theuer, University at Buffalo alumnus, BA Chemistry 1946 and EdM Sciences education 1950, in order to further science education, established the Ralph F. Theuer Endowment Fund in 1994. This award is presented annually to one or more outstanding students pursuing a degree in Chemistry or a graduate degree in Science Education at the State University of New York at Buffalo. Awardees are selected by the Department of Chemistry Undergraduate Affairs Committee, and students selected are presented their scholarship and certificate at the Department of Chemistry annual awards ceremony.

American Chemical Society Division of Analytical Chemistry Award—Since 1967, the American Chemical Society, Division of Analytical Chemistry, has presented this undergraduate award to encourage student interest in analytical chemistry and to recognize students who display an aptitude for a career in the field. The recipient is selected by the Undergraduate Affairs Committee, but is to have completed the third undergraduate year before the upcoming fall semester, and is expected to enroll for the following academic year. The award consists of an 8-month subscription (16 issues) to the journal Analytical Chemistry and a certificate of recognition, which is presented at the Department of Chemistry awards ceremony on commencement day.

American Chemical Society Division of Physical Chemistry Award— This award recognizes outstanding achievement by undergraduate students in physical chemistry, and to encourage further pursuits in the field. The award is presented to a senior, selected by the Undergraduate Affairs Committee on the basis of success in physical chemistry courses and undergraduate research in the field. The award consists of a certificate, and a one year free membership to the ACS Division of Physical Chemistry, which is presented at the Department of Chemistry awards ceremony on commencement day.

Peter T. Lansbury Undergraduate Research Award—Joseph P. Vacca, Ph.D. 1983, received the Merck Director's Award in recognition of his outstanding contributions to the discovery of Crixivan, an HIV protease inhibitor. Dr. Vacca selected the University at Buffalo as recipient of the Merck prize because of the important role UB played in his career. To honor his former Ph.D. mentor, Dr. Peter T. Lansbury, Professor Emeritus, Dr. Vacca created the Peter T. Lansbury Chemistry Award in 1999. This award is given periodically to a deserving undergraduate chemistry major, preferably in his/her junior year. The funds may be used to carry out summer research with a UB faculty member.

Sol J. Lederman Undergraduate Research Fellowship—Sol J. Lederman Research Fellows will be selected by the Chemistry Department Undergraduate Affairs Committee based on applications submitted by interested students. The committee will award the fellowship(s) to student who: (1) show special promise as a researcher, (2) have a

commitment from a mentor to provide matching funds in the form of a stipend, supplies, etc., and (3) have high promise of generating publishable results. At the end of the fellowship period, Sol J. Lederman Research Fellows must submit a short report (3-5 pages) summarizing their research activity and results.

Michael Detty Undergraduate Summer Research Award—Margaret Logan Detty, PhD, along with friends and family of the late Michael Detty, PhD, have created an endowed fund within the University at Buffalo Foundation, Inc. to be used for the purpose of supporting a student participating in a summer research opportunity with a faculty member in the Department of Chemistry. Our department is grateful to Margaret Logan Detty and the other donors for establishing this award, which honors Michael Detty's legacy and highlights his longstanding dedication to mentoring research students.

Sophomore Undergraduate Award—The Sophomore Undergraduate Award honors the top 1% of sophomore students in CHE203-251 and CHE204-252, based on cumulative rank, and is presented by the Department of Chemistry faculty. This elite group has been recognized through the presentation of this award since 1985, when the Department of Chemistry held its first annual awards ceremony. Each student receives a monetary award and a certificate.

Freshman Chemistry Award—The CRC Freshman Chemistry Award honors the top 1% of freshman students for academic excellence in CHE101-102, CHE105-106, and CHE107-108 based on cumulative rank, and is presented by the Department of Chemistry faculty. This elite group has been recognized through the presentation of this award since 1985, when the Department of Chemistry held its first annual awards ceremony. Each student receives a copy of the *CRC Handbook of Chemistry and Physics* and a certificate.

William E. Townsend Scholarship—Mr. William E. Townsend, UB Class of 1950 with a BA degree in Chemistry, in order to recognize worthy students at his alma mater, established the William E. Townsend Scholarship Fund in 1992. This award is presented annually to one or more freshman chemistry majors, preferably from the Western New York area, with demonstrated financial need and possession of good personal characteristics in terms of attitude, personality, citizenship and leadership. Recipients are selected by the Department of Chemistry Undergraduate Affairs Committee. The award may be presented to each awardee for up to four consecutive years, provided they remain a chemistry major in good standing with the University.

Jane C. Denton Award— This award given by Dr. Lawrence Frenkel, BA 1965 and Dr. Donald Schultz, BA 1965 in recognition of the inspiration Jane C. Denton gave to many. This award is given to female undergraduate students pursuing a degree in chemistry. Awardees are selected by the Department of Chemistry Undergraduate Affairs Committee, and students selected are presented their scholarship and certificate at the Department of Chemistry annual awards ceremony.

Medicinal Chemistry Scholarship – The Medicinal Chemistry Scholarship is given to a junior medicinal chemistry major. Awardees are selected by the Department of Chemistry Undergraduate Affairs Committee and students selected are presented their scholarship and certificate at the Department of Chemistry annual awards ceremony.

Albert Padwa Award – The Albert Padwa Award is intended to provide a stipend to an undergraduate student intern during a summer research project in the Department of Chemistry. Awardees are selected by the Department of Chemistry's Undergraduate Affairs Committee. The recipient of this award is required to provide a summary report at the conclusion of his/her research project.

Joseph & Louise K. Tufariello Award for Academic Excellence in Chemistry – First presented in 2003, this award was established in memory of Dr. Joseph J. Tufariello's parents, Joseph and Louise K. Tufariello, who, in spite of their own limited education, encouraged and supported him in his quest for the highest education possible. This award is presented annually to an outstanding graduating senior in the Department of Chemistry of the University at Buffalo as selected by the Undergraduate Affairs Committee.

Priscilla B. Clarke Chemistry Award – The Priscilla B. Clarke Award will be used by the Dean of the College of Arts and Sciences in consultation with the Department of Chemistry Undergraduate Awards Committee for an annual award that recognizes an outstanding Bachelor of Science graduating senior in the Department of Chemistry.

Priscilla B. Clarke Pioneer Award – The Department of Chemistry has established the Priscilla B. Clarke Pioneer Award which is presented annually to a graduating senior chemistry or medicinal chemistry major who exemplifies the character and dedication to service of the Department of Chemistry, in recognition of the decades of service provided to the Department by Priscilla B. Clarke.

Janet Litster Rideout, PhD Fund– Established in 2020, the Janet Litster-Rideout, PhD Fund is available to support undergraduate students majoring in Chemistry who have financial need. The fund can be used to support any need of the student, including but not limited to tuition, necessary books for classes, room and board, and experiential learning opportunities. Dr. Litster Rideout earned her PhD in Chemistry from UB in 1968 and went on to have a prolific scientific career, specializing in groundbreaking research in HIV/AIDS treatments. Recipients of this award will benefit from and carry forward Dr. Litster Rideout's legacy as a distinguished UB alumna.



Bulletin Board for Undergraduates

Chemistry majors should check the bulletin board located in the main office hallway right next to room 365 Natural Sciences Complex. The board should be consulted on a regular basis for important information regarding job possibilities, Departmental and SAACS events. Also, undergraduate research opportunities are posted here as well as events on the University level that may be of interest to students.

Chemistry Department E-mail List

The Undergraduate Office (363 NSC) currently maintains an e-mail list of current majors in the department. Announcements are sent to every major who wants to be on the list, and have included internship opportunities and reminders about University deadlines. It is recommended that when you receive your e-mail address, please inform the Undergraduate Office (ubchem@buffalo.edu) so that you can be included on future mailings.

Laboratory Safety Rules and Regulations

1. Full-coverage splash and impact safety goggles (vented mono-goggle type) must be worn at all times in undergraduate laboratories, without exception. (Compliant with ANSI 787.1-1989.) Ordinary plastic safety glasses are not acceptable. You will not be permitted in the laboratory without your safety goggles.
2. Proper clothing must be worn to protect your entire body from the neck down. A lab apron or lab coat is also required. Proper clothing includes: long-sleeved shirt that covers entire torso (no cropped or open-back tops), long pants that fully cover legs to the ankles (no ripped pants), shoes that cover the entire foot (no open-toe or open-back shoes), and long hair or any long head-coverings should be secured.
3. Certain experiments require the use of lab gloves. Do not wear gloves out of the lab and remove them before touching personal items such as phones, computers, pens and one's skin.
4. You should know where the safety equipment such as eye wash, safety shower, and fire extinguisher are located.

FIRES: A. Paper, wood, cloth fires: use water extinguishers.
 B. Flammable and combustible solvents, electrical fires: use CO₂ or dry powder extinguishers.
 C. Do not point a fire extinguisher directly at a flaming beaker or container. The sudden force may upset the beaker and spread the fire.
5. In the case of any fire, large chemical spill, noxious fumes, or other hazardous situation which compromises the safety of students in the lab room, the room must be evacuated. Remain calm, put your experiment into a safe mode (unplug any hotplates or equipment), exit the lab room single-file, walking to a safe location outside of the building. Stay together as a group. Your instructor will activate the appropriate alarms and electrical shutoffs.
6. First aid is available in the Stockroom. Use COLD water for all types of burns: e.g. fire, acid, base, etc. Report any injury, no matter how slight it may seem, to your lab instructor at once.
7. Horse play in the laboratory will not be tolerated. Eating, drinking, chewing gum, and smoking are not permitted in the laboratory.

8. SDS or Safety Data Sheets are available for all hazardous materials that you may encounter while working in the lab. An SDS will provide instructions for a particular chemical's safe use and also the hazards associated with it. Contact your instructor for more information.
9. Toxic and fuming chemicals are only to be used in or under the hoods.
10. All chemicals are to be closed and returned to their proper shelf spaces after use. Clean up any broken glass and any chemical spills immediately. Baths are to be returned to their containers after use. Broken glass is to be placed in containers marked GLASS ONLY. Paper and other waste materials (besides glass) are to be placed in the general trash cans. No paper, glass, etc. is to be dropped in the sinks. Remember: Do NOT mix glass, paper and chemicals. Put into individually marked containers.
11. In most cases, chemical waste is not permitted to be poured down sink drains. Only certain aqueous salt and buffer solutions are approved for drain disposal. Your instructor will inform you of which salt solutions are approved for drain disposal. All organic solvents such as liquid naphthalene, ethanol, etc. are never permitted to be poured down the sink but instead must be collected as hazardous wastes.
12. Unauthorized or unsafe experiments are prohibited.
13. Be sure the gas line is fully turned off when finished using the Bunsen burner and before leaving the laboratory.
14. When diluting acid, always pour the acid slowly into the water with stirring.
15. Some equipment, which is in short supply, may be borrowed by students from the Stockroom. Students will be required to give their UB ID card to check such items out. Items must be returned at the end of each class, and students will receive their UB ID back.

Further information about lab safety and proper treatment of chemical waste can be found at:

UB Environmental Health and Safety:
<http://www.facilities-buffalo.org/Departments/ehs>

American Chemical Society publications:
<http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/>

UB Chem Club - The ACS/SAACS Student Chapter

Room 255 Natural Sciences Complex
645-4110

SAACS, the Student Affiliates of the American Chemical Society, is an academic club designed to unite the University's undergraduate chemistry major population.

The ACS—American Chemical Society—is the parent organization and has thousands of members across the USA. The ACS certifies the numerous SAACS clubs which are located at all major universities in the United States.

The majority of members are chemistry majors with a few biochemists and chemical engineering majors. All students are welcome to the meetings and participate in any of the activities which are planned; there is no charge for being a member. To become officially recognized by the ACS there is a nominal membership fee of \$10 per year—this includes a subscription to “*Chemical and Engineering News*” from October to May. C&EN is a weekly publication which has a few technology related articles and reports on the job situation for chemists and engineers. In addition, a wealth of information about chemistry and careers can be found on the ACS website:

<http://www.acs.org>.

Our “UB Chem Club” is involved in a wide range of activities. If you are a chemistry major, check out their discord server or stop by their office! They participate with the graduate students during “National Chemistry Week” in the local elementary schools, and serve as student representatives during the fall and spring Open House. In addition to club social activities, the Student Affiliates organize an annual Research Exposition to introduce students to research opportunities in faculty laboratories.

The meetings and events sponsored by SAACS are communicated through the discord server linked below and on flyers outside their office. More information may be found by contacting the Undergraduate Office, or by calling the SAACS office at the above number.






UBchemclub



**Meetings every
first
Wednesday**

Get to know the
UBChemClub, the ACS
Student Chapter at UB!



Scan to Join Our
Discord!

Meet new people
and learn about
upcoming events!



Career Services and Student Assistantships

Chemistry Majors: We have resources to help you investigate graduate and professional school options as well as career options. Visit us often during your time at UB!

Several undergraduate student assistantships or work study are available in the Department of Chemistry. Chemistry majors may apply for employment through Bullseye powered by Handshake. Applications are accepted at all times during the year, but the majority of assistantships are awarded two weeks prior to each semester. For further questions about student employment opportunities please refer to the Career Design Center

Professional Job Search: Career Services provides a variety of services for job hunting students. To prepare for the job search, students can use the facilities of the office to gain information on effective resume writing and on interview and job search techniques. The office also houses a library of career literature from various employers and professional job descriptions. This material offers students an opportunity to identify and research potential employers.

Services provided by the Career design center include counseling, self-assessment testing, and career information. Through [Bullseye powered by Handshake](#), students can be brought together with hundreds of employers and thousands of job and internship vacancies. Services offered are described on the web site <https://www.buffalo.edu/career.html>

Resumes & More: Get expert advice for writing your resume or curriculum vitae (CV), view samples and templates, and learn how to tell your unique story.

**Schedule your
career counseling
appointment today!**

**Call 716-645-2231
or stop by
259 Capen Hall or
make an [appointment online](#)**

Appendix I:
***Internet Resources
for Chemistry
Students***

UB Chemistry
Department Homepage:
[Department of
Chemistry - University
at Buffalo](#)

American Chemical
Society Homepage:
<http://www.acs.org>

UB's Libraries:
[University at Buffalo
Libraries](#)

NIST Chemistry
Webbook (NIST
Standard Reference
Database No. 69):
[NIST Chemistry
WebBook](#)

TAURUS (searchable
database for courses at
other colleges equivalent
to UB courses):
[TAURUS - University at
Buffalo](#)

***Academic &
Department Info:***
[Chemistry -
Undergraduate
Academic Programs -
University at Buffalo](#)

UB Homepage:
[Welcome to the
University at Buffalo -
University at Buffalo](#)

UB Class Schedules:
[MyUB \(buffalo.edu\)](#)

UB Calendar of
Registration Dates:
[Calendars | UB Office
of the Registrar
\(buffalo.edu\)](#)

***Contact Information
for Chemistry
Students***

By mail:
Department of
Chemistry
359 Natural Sciences
Complex

By telephone:
Main Number: (716)
645-6805
FAX: (716) 645-6963
By email:
ubchem@buffalo.edu

Department of
Chemistry Chair:
Prof. Javid Rzayev
(716) 645-4314
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Department
Administrator:
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Director of
Undergraduate Studies:
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(716) 645-4144

email:
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Undergraduate Studies
Coordinator:
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mashour@buffalo.edu

Organic Chemistry Lab
Director and
Chemistry Department
Safety Officer:
Dr. Khalid Ahsan
(716) 645-4115
email:
ahsan@buffalo.edu

Director, General
Chemistry Laboratory :
Dr. Rachel Ventura
Office: 266 Natural
Sciences Complex
(716) 645-1494
Email:
rdibbell@buffalo.edu

Academic Advisement:
275 Park Hall, North
Campus, 645-6883
[Student Advisement
and Services -
University at Buffalo](#)

Career Design Center:
259 Capen Hall, North
Campus, 645-2231
[Career Design Center -
Career Design Center -
University at Buffalo](#)

Chemistry Dept.
Undergraduate Office:
359 Natural Sciences
Complex, 645-6800

[Undergraduate
Overview - Department
of Chemistry -
University at Buffalo](#)

Counseling Center:
120 Richmond, North
Campus, 645-2720
[Counseling Services -
Student Life Guide -
University at Buffalo](#)

Accessibility Services:
60 Capen Hall, North
Campus, 645-2608,
[Accessibility Resources
- Student Life Guide -
University at Buffalo](#)

**Financial Aid to
Students:**
1Capen (North Campus)
114 Diefendorf (South
Campus)

Phone: 716-645-8232
[Financial Aid – State
University of New York
\(buffalo.edu\)](#)

Health Services:
4350 Maple Rd, Buffalo,
NY14226
[Student Health
Services - Student Life
Guide - University at
Buffalo](#)

**International Student &
Scholar Services:**
210 Talbert, North
Campus, 645-2258
[International Student
Services - University at
Buffalo](#)

Student Life:
520 Capen Hall
[Student Life Guide -
University at Buffalo](#)

Public Safety:
EMERGENCY 645-2222

Office of the Registrar
1 Capen, North Campus,
645-5698
[UB Office of the
Registrar \(buffalo.edu\)](#)

**Fitness Centers &
Recreation:**
[Fitness Centers &
Recreation - Campus
Living - University at
Buffalo](#)

Veteran Services:
321 Student Union,
Phone: (716) 829-5586
[Veteran Services -
Student Life Guide -
University at Buffalo](#)